

## GENERAL INDEX

## AIResearch Corporation

Awarded contract for design of a linear induction motor for a tracked air cushion vehicle, July 43

## ACI interface specification approved by Communications &amp; Signal Section AAR, Nov 17

## ACI Systems Corp.

To sell ACI equipment, Nov 34

## Alton &amp; Southern Railroad

General Electric GE/PAC 4000 process control computer in automatic classification yards at East St. Louis, Ill. July 16

## American Data Systems

Video communications terminal, Sep - Product Showcase

## American Enka Corp., Brand-Rex Div.

Brand-Rex catalog, Nov 30

## American Pamcor Inc.

AMP-Pak kits, Nov 30

Pressure-sensitive tape, July 37

Sealing, insulating tape, Jan 44

Wire cutter, Sep 62

## American Society of Mechanical Engineers

Electrification top item at Apr 1 meeting, Mar 32

Impact on signal and communications facilities described at ASME/IEEE meeting, May 21

## American Telephone &amp; Telegraph Co.

Asks remand of Microwave Communications Inc. case to FCC, Aug 10

Considers user to supply data sets, Mar 33

FCC asked to deny applications for microwave network, June 46

FCC issues directive to clear way for WU to acquire Bell Systems teletype exchange service in 1971, Oct 43

FCC OKs unlimited Telpak sharings, July 34

Interconnection units should be certified, Nov 34

Millimeter waves transferred in pipe can carry 250,000 phone calls simultaneously, Apr 43

Private line services of voice grade or narrower bandwidth may be shared, Apr 36

Sale of teletypewriter exchange service to WU approved by FCC, Aug 11

Seek full hearing on Datran microwave systems, Aug 10

Telpak rates are now competi-

tive, July 34

Telpak sharing argument heard by FCC, Mar 32

Telpak tariff progress report, Feb 8

TWX plus Telex equals more competition, June 40

Western Union will buy TWX service, Mar 33

## Ampex Corporation

Bin loop recorder reproducers used at 27 hotbox detector locations to provide recorded messages to passing train crews, July 23

Southern Pacific gets waybill data fast from video tape system, May 24

## Analytical Techniques

Railroads exchange information on analytical techniques, Sep 52

## Andrew Corporation

Antenna systems, Feb 36

Microwave antenna, Sep 58

## Ansonia Wire &amp; Cable Co.

Appoints National Accessories Co., Inc. of Philadelphia, Pa. as sales representatives May 37

## Antennas

Antenna Guide (Antenna Specialists Co.) June 34

Antenna systems (Andrew Corp.) Feb 36

Microwave antenna (Andrew Corp.) Sep 58

## Antenna Specialists Company

Antenna guide, June 34

## Association of American Railroads

Favor revision of left hand signal rule, Dec 41

FCC hears arguments on Telpak sharing, Mar 33

Goodfellow, Thomas M., Pres. Government's role in railroading, Oct 32

Interconnection units should be certified, Nov 34

Label deadline set for Jan. 1, 1971, July 34

Minger, W. K., Manager Data

Systems Special Projects

Network model is in final stages, Sep 50

Opposes proposal of FCC to raise fees, July 34

Telpak sharing order stayed up to 90 days, Nov 34

## ASTRO (America's Sound Transportation Review Organization) Oct 32

Atchison, Topeka & Santa Fe Railway (See Santa Fe)

Author:

Alward, S. A.

Batch processing lesson of 60's, Oct 30

## Benson, W. R.

AAR network model is in final stages, Sep 50

## Cass, R.

Canadian National connects ACI to mini-computer, Dec 14

## Cetinich, J. N.

AAR network model is in final stages, Sep 50

## Clayton, W. Graham, Jr.

Management involvement in systems and computer activity, Oct 28

## Cox, James

Track circuit shunting tested on electrified suburban line, Apr 18

## Crane, R. R.

Computers widely used by managers, Oct 31

## Crouch, C. A.

How to use ACI interface, Nov 14

## George, E. O.

Economics of electrification, Mar 14

## Germany, J. W.

Communications/computer systems will be exploited by railroads, Oct 31

## Goodfellow, Thomas M.

Government role in railroading, Oct 32

## Haggar, T. R.

Microwave uses pulse code modulation, Sep 21

## Hesser, J. M.

Train-stop criteria for hotbox detectors, Nov 22

## Hewett, M. W.

Radio control is helping locomotives, Oct 23

## Hoyler, R. C.

Advocates advantages in improved technology, Mar 19

## Hughes, R. O.

Data exchange discussed, Oct 29

## Hursh, C. M.

Halts modulation controls for signaling, Nov 28

## Johnson, W. B.

Pulse modulated controls for block signaling, Oct 23

## Jones, John L.

Southern ups efficiency via EDP, May 27

## Jorgensen, J. L.

Discusses data exchange, Oct 29

## Kalra, R. P. S.

Automatic train stopping has been developed for rapid transit, May 18

- Lindberg, Victor L.  
Improved flashing lights for highway crossing protection, Oct 18
- Lindsay, A. H.  
Care for nickel-cadmium batteries, Aug 25
- Massie, H. L.  
Radio control is helping locomotives, Oct 23
- Mehl, R. H.  
Modeling via computer aids yard design, July 21
- Minger, W. K.  
AAR network model is in final stages, Sep 50
- Mitchell, M. B.  
Federal role will be increased in C&S research, Oct 20
- Neuschel, Robert P.  
How to obtain more computer capability, Oct 29
- Osborn, Prime F. III  
Key to service, Oct 29
- Pace, N. C.  
Train-stop criteria for hotbox detectors, Nov 22
- Petrash, Robert A.  
ACI freight car labeling, Oct 32
- Pierce, P. E.  
Track circuit: Pulse modulated controls, Oct 26
- Pipas, George  
Data exchange discussed, Oct 29
- Robertson, Hugh M.  
HVDC transmission line ready for service on Pacific Coast, July 18  
HVDC transmission may cause interference to communications circuits, Dec 28
- Saltsberg, Theodore  
Integrated circuits, Oct 20
- Schwendeman, Robert J.  
Transit communications has radio, intercoms, Aug 16
- Shew, E. B.  
Technical aspects of electrification, Mar 14
- Shih, R. C.  
Modeling via computer aids yard design, July 21
- Sibley, H. C.  
Factors to be considered discussed, Oct 21
- Sines, G. S.  
Data systems should support railroad operation, Oct 31
- Spence, R. D.  
Efficient transportation needs C&S efforts, Oct 18
- Thorne-Booth, G. M.  
Automatic train stopping has been developed for rapid transit, May 18
- Wilson, Peter B.  
Cybernetics can provide better controls, Oct 30
- Automatic block signaling  
Track circuit: Pulse modulated controls, Oct 26
- Automatic Car Identification  
ACI scanners to be installed by Seaboard Coast Line, Aug 11  
ACI system (WABCO, Signal & Communications Div.) Sep - Product Showcase  
Can ACI be a decongestant for railroad terminals, Aug 26  
Canadian National connects ACI to mini-computer, Dec 14  
Canadian National orders ACI system from Sylvania Electric Products, Aug 11  
Computer Identics obtains ACI label quality control, Sep 17
- DT&I awards contract to Sylvania Information Systems for 18 KarTrak ACI systems, Oct 43
- Freight car labeling, Oct 32
- Guidelines for determining usefulness of ACI, Feb 22
- How to use interface standards, Nov 14
- Illinois Central to install ACI at Markham yard and at Memphis terminal, Apr 17
- Installed by Brussels subway for better service, Feb 32
- Label deadline set for Jan. 1, 1971, July 34
- MP tests ACI at Dupon, Ill. yard Jan 32
- Missouri Pacific will continue testing, Feb 23
- Mosler Safe Co. named field service representative by WABCO, July 43
- Santa Fe orders 9 ACI systems for KC yard from Sylvania Commercial Electronics Div., Nov 34
- Studies reveal benefits, Mar 22
- Texas & Pacific will install ACI at Lancaster yard at Ft. Worth, Texas, Feb 41
- Twenty-two member roads in Chicago General Managers plan to participate in the ACI interchange and information network, Aug 27
- Automatic Electric Co.  
Pushbutton keyset, Jan 44
- Automatic Electric S.A. (ATEA) of Antwerp  
Furnishes Sylvania KarTrak ACI system, Feb 32
- Automation Products Division, General Automation Inc.  
Process control computer, Apr 31
- Automatic Train Control  
Southern will upgrade signals, remove ATS, June 41  
240 transit cars of NYCTA equipped, July 34
- Automatic Train Operations  
14-mile Victoria line, Great Britain, has automatic train operation in service for one year, May 35
- PATCO runs trains automatically to serve Philadelphia, Mar 24
- Automatic Train Stop  
Penn Central gets relief to operate locomotives with either ATS or ACS cut out on 300 miles of line, Feb 39  
Southern will upgrade signals, remove ATS, June 41
- Automatic yards (See yards)
- BART (Bay Area Rapid Transit)  
Automatic fare collection, May 11  
Awards \$5 million information system contract to Stewart-Warner electronics, Nov 34  
Communications for rapid transit cars, Aug 18, 21  
Computer usage, May 11, 13  
Controls "dry run" tested, May 13  
Control testing advancing rapidly, July 42  
Test cars to run in control check, Mar 32
- Batteries (Also see power supplies)  
Care for nickel-cadmium batteries, Aug 24  
Nickel-cadmium battery (Exide Power Systems Div. ESB Inc.) Sep - Product Showcase  
Primary batteries (Union Carbide Corp.) June 35  
Storage battery filler (Thomas A. Edison Industries) Sep 60
- Battery chargers (See rectifiers)
- Bell System (See American Telephone & Telegraph Co.)
- Belt Railway of Chicago  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Bethlehem Steel Corp.  
Radio controlled units help steel company, Dec 19
- Biddle, James G. Co.  
Test set, Sep 65
- Block signals and traffic control, Jan 28
- Bonneville Power Administration  
HVDC transmission may cause interference to communications circuits, Dec 28  
Open-wire line systems may be affected by HVDC transmission, July 20
- Books  
Electronic Circuit Design Handbook, 3rd edition, Aug 37  
Electronic Test & Measurement Handbook, Aug 37  
Engineer's Relay Handbook Aug 37



- Fundamentals of Digital Computers, July 44  
 Management Information Systems Handbook, July 44  
 1970 Popular Tube/Transistor Substitution Guide, July 44  
 Solid-State Circuit Design & Operation, July 44
- Boston & Maine**  
 Installs CTC at Everett Junction, Mass., Feb 40  
**Bramco Controls Div., Lédex Inc.**  
 Touch-tone receiver modules, Sep 65  
**British Railways**  
 Install Servo hotbox detectors, Dec 41  
**Broken wheel detectors (See detectors)**  
**Brotherhood of Locomotive Engineers**  
 Oppose left hand signal rule, Dec 41  
**Brotherhood of Railroad Signalmen**  
 Formal training asked for in notice, June 42  
 Oppose left hand signal rule, Dec 41  
 Signalmen authorized to call strike if mediation fails, Dec 41  
 Signalmen take strike vote in wage case, Aug, 11  
 Signs agreement with Long Island on signal training, Feb 39  
**Brussels, Belgium subway installs**  
 ACI for better service, Feb 32  
**Bungalows (See Housings)**  
**Burlington Northern Inc.**  
 Enlarges telephone network, Dec 13  
 General Electric GE/PAC 4020 process control computer in automatic classification yard at Pasco, Wash., July 16  
 Honeywell DDP-516 process control computer in automatic classification yards at N. Kansas City, Mo., July 16  
 Orders radio units from S&C Div. WABCO, Aug 11  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
 Receives approval for installation of two traffic control systems in Washington, Oct 44  
 Sets up data processing service June 40  
**Burroughs Corp.**  
 TC 500 on-line terminal, Sep-Product Showcase  
**C&D Batteries, Division of Eltra Corp.**  
 Member of Storage Battery Section of NEMA, Apr 36  
 Moves to Plymouth Meeting, Pa., Apr 42
- C&O/B&O Railroads**  
 Electronic telephone switchboard installed at Cumberland, Md., Dec 40  
 Equips locomotive with radio, Aug 11  
 New telephone switchboard, Dec 12  
 Order two-way radio sets, Mar 32  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Cab signaling**  
 Penn Central gets relief to operate locomotives with either ATS or ACS cut out on 300 miles of line, Feb 39
- Cable**  
 AMP-PAK kits (terminals & connectors (American Pamcor Inc.) Nov 30  
 Braided patch cords (Western-Cullen Div. Federal Sign & Signal Corp.) Sep - Product Showcase  
 Brand-Rex catalog, wire & cable products (Brand-Rex Div. American Enka Corp.) Nov 30  
 Cable cutter (Mathias Klein & Sons Inc.) Nov 33  
 Comprehensive guide-G10-04 (General Cable Corp.) June 35  
 Filter assemblies (Lynch Communication System Inc.) May 31  
 Power cable bulletin (The Kerite Company) Sep - Product Showcase  
 Splice kits (Hyson Div., The Dexter Corp.) Dec 38  
 Tape, pressure-sensitive (American Pamcor Inc.) July 37  
 Tape, sealing, insulating (American Pamcor Inc.) Jan 44  
 Wire Harness Jig Board (Panduit Corp.) July 37  
**Cable Communications Systems Inc.**  
 Coaxial cable systems, Sep - Product Showcase  
**California Computer Products Inc.**  
 Digital plotting systems, Sep - Product Showcase  
**Canadian Marconi Co.**  
 Hagger, T. R., Manager Market Research  
 Microwave uses pulse code modulation, Sep 21  
 Microwave multiplex system, Sep 60  
**Canadian National Railways**  
 Cass, R., Senior Research Engineer  
 Canadian National connects ACI to mini-computer, Dec 14  
 CN orders CTC formainline, Dec 40  
 CTC used for terminal control in Toronto, Feb 18
- Install Servo hotbox detectors, Dec 41  
 Orders ACI system from Sylvaia, Aug 11  
 Wilson, Peter B., Chief of Cybernetic Research & Industrial Engineering  
 Cybernetics can provide better controls, Oct 30  
**Canadian Pacific Railway**  
 Honeywell DDP-516 process control computer in automatic classification yards at Calgary, Alta., July 16  
 Romoff, Harvey M., Manager Dept of Research  
 Discusses relationship between cybernetics and government regulations, June 33
- Carrier**  
 HVDC transmission may cause interference to communications circuits, Dec 28  
 Open-wire line systems may be affected by HVDC transmission, July 20  
 Carrier equipment, Jan 25  
**Cathode Ray Tubes (See I/O devices)**  
**Catholic Protection**  
 HVDC transmission may cause interference to communications circuits, Dec 28  
 Problems arising in vicinity of HVDC transmission lines, July 19  
 Catholic protection problems arise in vicinity of HVDC transmission lines, July 19  
**CCI Corporation**  
 RACO celebrates 50th anniversary, Sep 34  
 RACO stock acquired, Feb 42  
**Centralized Traffic Control (See CTC)**  
**Chesapeake & Ohio/Baltimore & Ohio Railroads (See C&O/B&O)**  
**Chicago & Eastern Illinois**  
 FRA approval for CTC obtained, June 39  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
**Chicago & Illinois Western**  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
**Chicago & North Western**  
 Applies to FRA for approval to remove automatic train stop devices, Oct 40  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
**Chicago & Western Indiana**  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27

- Chicago, Burlington & Quincy Railroad (See Burlington Northern)
- Chicago, Milwaukee, St. Paul & Pacific Railroad (See Milwaukee Road)
- Chicago Produce Terminal  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Chicago River & Indiana  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Chicago, Rock Island & Pacific Railroad (See Rock Island)
- Chicago Short Line  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Chicago South Shore & South Bend  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Chicago, West Pullman & Southern  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Chicago Transit Authority  
CTA installs bus monitoring system, July 26  
Computer usage, May 11  
Circuits: integrated, Oct 20  
Circuits: solid state  
Factors to be considered, Oct 21
- Classification yards (See yards)
- Clearance detectors (See detectors)
- Cleveland Institute of Electronics  
RS&C self teaching lessons, Sep - Product Showcase
- Cleveland Transit System  
Receives additional cab signal and speed control equipment, Jan 42
- Cognitronics Corp.  
OCR Unit ROCR System/70, Sep - Product Showcase
- Collins Radio Co.  
Microwave radio relay system, Sep 58  
Will furnish equipment for proposed new large microwave stations of Data Transmission Co., Jan 43
- Communications  
ACI interface standard set by AAR, Nov 17  
Common carriers would blanket US with microwave systems, Oct 40  
Communications/computer systems will be exploited by railroads, Oct 31  
Communications spending for 1970 to hit \$36.5 million, Jan 22  
Communications spending rises, Dec 11  
HVDC transmission may cause interference to communications circuits, Dec 28  
Impact on signal and communications facilities described at ASME/IEEE meeting, May 21  
Inband signaling systems (Lynch Communications System) Mar 30  
Input/output terminal specifications issued by Data Systems Division, AAR, Sep 47  
L&N trains communications men, Oct 15  
Microwave in service at Sacramento-Portola, Cal., Nov 27  
Millimeter waves transferred in pipe can carry 250,000 phone calls simultaneously, Apr 43  
Private line service of voice grade or narrower bandwidth may be shared, Apr 36  
Santa Fe finds better way, June 18  
Slight drop in installations made in 1969, Jan 30  
35 foreign railroads report plans to spend \$270 million in '70, June 43  
UP upgrades communications for MIS, Feb 41  
Communications & Signal men explore technology, Oct 18  
Communications & Signal Research  
Federal role will be increased in C&S research, Oct 20  
Communications & Signal Section AAR Annual meeting program San Francisco, Cal., Sep 27 - Product Showcase Report  
Approves ACI interface specifications, Nov 17  
Committee reports - annual meeting, Oct 27  
New equipment and techniques discussed at Sectional meeting at Netherland Hilton Hotel in Cincinnati May 21, May 35  
Outline signal principles, Mar 18  
10th annual meeting at San Francisco, Oct 18  
Two sectional meetings to be held - St. Paul & Cincinnati, Mar 32  
C&S expenditures show gain in 1970, Jan 22  
C&S spending  
Nine railroads plan to spend \$40 million, Jan 42  
Rises in '69 over '68, July 34  
Communications Equipment  
Coaxial cable systems (Cable Communications Systems Inc.) Sep - Product Showcase  
Encoder (Reach Electronics Inc.) Sep 59  
Four-wire bridge (Farinon Electric) Dec 39  
Inband signaling system (Westcom Inc.) Nov 33  
Communications equipment installed 1965-1969, Jan 31  
Communications in 1969:  
Carrier equipment, Jan 25  
Computer units, Jan 25  
Data modems, Jan 25  
Intercom systems, Jan 24  
Microwave, Jan 24  
Pole line cable construction, Jan 25  
Telephone, Jan 24  
Teleprinters, Jan 25  
Two-way radio, Jan 24  
Communications maintenance (See Maintenance)  
Computers  
Engineering computers (EMR div. Weston Instruments Inc.), Dec 39  
Hardware and configuration for data processing by the General Managers Assn. ACI interchange and information network in Chicago, Aug 26  
Illinois Central centralizes controls, Apr 13  
Mass transit extends computer applications, May 11  
Mini-computer (Hewlett-Packard Company) Sep 56  
Penn Central automates Columbus Ohio classification yard, Sep 14  
Process control computer (Automation Products Div. General Automation Inc.) Apr 31  
Process control computer installed in automatic freight classification yards, July 12  
WP gains control via its centralized computer, Jan 16  
Computer Identics Corp.  
Developing and marketing piggyback terminal controls systems for IC, July 34  
Quality control for ACI labels, Sep 17  
Computer Machinery Corp.  
Computer-controlled keyboard input system, Sep - Product Showcase  
Computer units, Jan 25  
Computer Usage (Also see Computers & Cybernetics)  
Computer Identics obtains ACI label quality control, Sep 17  
Decade of Seventies sees more EDP usage, May 37  
IBM computer programs called Tariff Publishing System and Traffic Profile Analysis System help shippers and railroads, May 37  
John L. Jones says Southern ups efficiency via EDP, May 27  
Simulate to survive, Feb 46  
Conrac Corp.  
Display modules, Dec 39  
Continental Telephone Electronics Corp.



Carrier levelmeter, Oct 38  
 Continuous Computer Power Inc.  
 P-1000 automatic power system,  
 Sep - Product Showcase  
 Control Data Corp.  
 Model 6400 or 6600 computers  
 to handle AAR network model,  
 Sep 51  
 Control machines  
 Interlocking & CTC panels  
 (Railroad Accessories Corp.)  
 June 35  
 Copperweld Steel Company  
 Fencing, June 34  
 Cox, W. T. Company  
 Shunting system, Jan 47  
 Crossing protection  
 Crossing gate (General Railway  
 Signal Co.) Nov 30  
 Flasher, solid state (Railroad  
 Accessories Corp.) Jan 44  
 Grade crossing can be improved,  
 June 40  
 Improved flashing lights for  
 highway crossing protection,  
 Oct 18  
 Long Island extends crossing  
 program, Dec 41  
 Rail-highway crossing accidents  
 dropped again in 1969, Aug  
 11  
 Relay, crossing (Railroad Access  
 ories Corp.) Mar 30  
**CTC**  
 Approval given by FRA to MKT  
 for installation of CTC,  
 June 43  
 Boston & Maine installs new fa-  
 cilities at Everett Junction  
 Mass., Feb 40  
 Burlington Northern receives OK  
 on CTC request, Oct 44  
 CN orders CTC for mainline,  
 Dec 40  
 Factors to be considered, Oct  
 21  
 FRA approval for Chicago & East  
 ern Illinois made, June 39  
 Great Northern installs CTC on  
 65 miles of line from Jen-  
 nings to Stryker, Mont., Feb  
 40  
 Railroad running can be im-  
 proved, Feb 17  
 Seaboard Coast Line has approv-  
 al to install CTC in South  
 Carolina, Feb 39  
 Southern installs system be-  
 tween Ludlow, Ky. and Chat-  
 tanoochee, Tenn., Feb 40  
 Southern will upgrade signals,  
 remove ATS, June 41  
 Used by Canadian National for  
 terminal control, Feb 18  
 Cybernetics (Also see Computers &  
 Computers Usage)  
 AAR network model is in final  
 stages, Sep 50  
 Abstracts of papers  
 Boyd, Alan S., President  
 IC, forecasts cybernet-  
 ics progress in 1980's,  
 June 32

Romoff, Harvey M., manager  
 Department of Research  
 CP discusses relations  
 between cybernetics  
 and government regu-  
 lations, June 33  
 Automatic classification  
 yards have process con-  
 trol computers, July 12  
 Batch processing lesson of  
 60's, Oct 30  
 Canadian National connects  
 ACI to mini-computer,  
 Dec 14  
 Communications/computer systems  
 will be exploited by rail-  
 roads, Oct 31  
 Computer Identics obtains ACI  
 label quality control, Sep  
 17  
 Computer program simulates  
 large heavy loads moving  
 over rail lines, Apr 40  
 Computer simulation of railroad  
 operations (AAR network mod-  
 el) Sep 50  
 Computer systems will have  
 greater use by managers,  
 Oct 31  
 CTA installs bus monitoring  
 system, July 26  
 Data systems should support  
 railroad operation, Oct  
 31  
 Detroit & Toledo Shore Line  
 has realtime computing,  
 Dec 22  
 Expands into many rail areas,  
 June 32  
 FCC issues tentative decision  
 on data firms, June 28  
 Four railroads share car move-  
 ment data, Sep 68  
 Input/output terminal specifi-  
 cations issued by Data Sys-  
 tems Div. AAR, Sep 47  
 John L. Jones says Southern  
 ups efficiency via EDP, May  
 27  
 Manager vs cybernetics, Edit-  
 ors Corner, June 50  
 Modeling via computer aids yard  
 design, June 32  
 Railroads exchange information  
 on analytical techniques,  
 Sep 52  
 Terminal car control developed  
 by MP, Apr 42  
 Third International Symposium  
 on Cybernetics, Tokyo, Jap-  
 an, June 32

#### Data

Getting your money's worth  
 Editor's Corner, Nov 38  
 Data communications or transmis-  
 sion (See communications)  
 Data Instruments Company  
 T30 recording/transmitting

typewriter, Sep - Product  
 Showcase

#### Data modems

Acoustic modem (Data Products  
 Stelma Telecommunications)  
 Sep 58  
 Data communications set (Len-  
 kurt Electric Co., Inc.)  
 June 35  
 Data couplers (Novation Inc.)  
 Sep 57  
 Data set (General Electric Co.)  
 Apr 31  
 Data set (General Electric Tel-  
 ecommunications Products  
 Dept.) May 31  
 Data set (International Com-  
 munications Corp.) Dec 38  
 Data set (Lenkurt Electric Co.  
 Inc.) Aug 34  
 Data set (Lynch Communications  
 System) July 36  
 Data set (Tele-Dynamics, Div.  
 of Ambac Industries Inc.)  
 Sep 59  
 Data set, FM-18 (Rixon Electron-  
 ics Inc.) Sep 56  
 Modems, Jan 25  
 Modems (Sangamo Electric Co.)  
 Mar 31  
 Narrow-band modem (ESE Limited)  
 Sep 56  
 Data modem characteristics (See  
 Data Sheets)  
 Data or Information Exchange  
 Data Systems Div. workshop  
 discussion, Oct 29  
 Data processing (See Cybernetics)  
 Data Products Corporation  
 Computer-communications term-  
 inal, Sep - Product Showcase  
 Data Products Stelma Telecommu-  
 nications  
 Acoustic modem, Sep 58  
 Data Research Corporation  
 Voltage transient monitor, Sep  
 67  
 Data Services Co.  
 Formed by Western Union Corp.  
 for data services, Aug 10  
 Data Sets (See Data Sheets)  
 Data Sheets  
 \* 184-Data modem characteristics,  
 Jan 38  
 185-Data modem characteristics,  
 Feb 33  
 186-Data modem characteristics,  
 Apr 38  
 187-Data modem characteristics,  
 May 34  
 188-Data modem characteristics,  
 June 38  
 189-Data modem characteristics,  
 July 32  
 Data Systems  
 Bulletin ECD-11A (General Elec-  
 tric Communication Products  
 Dept.) July 37  
 Data Systems' men look to 70's,  
 Oct 18  
 Data Systems Division, AAR  
 Annual meeting in Atlanta, Ga.,  
 Sep 30 (Product Showcase)

Special Report)  
 Annual meeting - Atlanta, Ga., Oct 28  
 Editor's Corner: Need for co-operation, Oct 46  
 Issues input-output terminal specifications, Sep 47  
 Petrash, Robert A., Executive Director  
 ACI freight car labeling, Oct 32  
 Reports on ACI, UMLER, TRAIN & SPLC, Oct 32  
 Railroads exchange information on analytical techniques, Sep 50  
**Data Transmission**  
 Code converter (Nationwide Electronic Systems Inc.) June 34  
 Communications adaptor (Mohawk Data Sciences Corp.) Sep - Product Showcase  
 Communications spending rises, Dec 11  
 Correction on usage charges, Apr 36  
 Data systems (Lenkurt Electric Co., Inc.) Dec 38  
 Data terminal (Lynch Communication System) June 34  
 Datatone RTCT (Datatone Div. Trepac Corporation of America) Dec 38  
 FCC issues tentative decision on data firms, June 28  
 FSD converter (Tele-Dynamics) June 34  
 Infrared light transmitter installed at University of Colorado, Jan 42  
 Multiplex (United Business Communications Inc.) Sep 60  
**Data Transmission Co.**  
 Correction on usage charges, Apr 36  
 Proposes new wide microwave system, Jan 43  
**Dataprobe Inc.**  
 Data terminal interface test set, Aug 34  
**Datran**  
 Correction on usage charges, Apr 36  
 Plans to build \$375 million microwave system, June 46  
 Denver & Rio Grande Western  
 Dispatcher-control of radio stations is over entire system, Feb 26  
**Department of Transportation**  
 Grant announced for study of tracked air cushion vehicles for Los Angeles line, Aug 10  
 Grants \$862,000 for 50% of costs of extending electrified commuter service of the Reading, June 40  
 Trains can reach 300 mph from 3rd rail pickup, Jan 43

## Detectors

Bin loop recorder reproducers used at 27 hotbox detector locations to provide recorded messages to passing train crews, July 23  
 Florida East Coast expands usage, June 39  
 Hotbox and dragging equipment, Dec 46  
 Illinois Central centralizes readouts at Chicago, Apr 13  
 Magnetic wheel detector (Siemens America Inc.) Apr 31  
 Oregon Technical gets license for hotbox detector, Nov 34  
 Safety detector, Jan 29  
 Train stop criteria for hotbox detectors, Nov 25  
 Wheel thermo-scanner unit (General Railway Signal Co.) Sep - Product Showcase  
 Detroit & Toledo Shore Line  
 Has realtime computing, Dec 22  
 Detroit Edison Co.  
 E. O. George, President  
 Economics of electrification, Mar 14  
 Detroit, Toledo & Ironton  
 Awards contract to Sylvania Information Systems for 18 KarTrak ACI systems, Oct 43  
 Hughes, R. O., Director Management Services  
 Discusses data exchange, Oct 29  
 Speeds data to computer via FAX, Nov 34  
**Digital Equipment Corp.**  
 PDP8/1 computer used to check ACI label quality, Sep 17

Edison, Thomas A. Industries  
 Primary Battery Division  
 Battery chargers, Jan 48  
 Storage battery filler, Sep 60

## Editor's Corner:

ACI: The time is now, Aug 42  
 A new look - a new decade, Jan 50  
 Communicate to serve, Sep 70  
 Cybernetics: Better control Oct 46  
 Data pollution is here, May 42  
 Getting the most from data, Nov 38  
 Manager vs cybernetics, June 50  
 Planning involves details as well as vision, July 46  
 Service organizations and their role in the railroad industry, Sep 70  
 Simulate to survive, Feb 46  
 Speed restrictions on tank cars carrying flammable gases, Dec 46  
 Training is in, Mar 38

## Education

Formal training asked for in notice by BoFRS, June 42  
 Glossary of commonly used computer terms (General Automation Inc.) Sep 56  
 International Correspondence Schools announces new FCC commercial radio telephone license course, July 42  
 L&N trains communications men, Oct 15  
 Long Island starts signal training course, Feb 39  
 RS&C self-teaching lessons (Cleveland Institute of Electronics) Sep - Product Showcase  
 Training is in, Mar 38  
**E.F.I. Inc.**  
 Leak detector, Nov 30  
 Electric switch lamps, Jan 29  
**Electrification**  
 Economics of electrification, Mar 14  
 Halts modulation controls for signaling, Nov 28  
 Impact on signal and communications facilities described at ASME/IEEE meeting, May 21  
 Long Island extends electrification 16 miles, Dec 41  
 Main topic at IEEE/ASME meeting, Mar 32  
 Outlook brightens, Mar 13, 17  
 Reaches 2500 mile mark, Mar 17  
 Southern Pacific considers installation between Colton, Cal. and El Paso, Tex., Oct 43  
 Technical aspects of electrification, Mar 16  
 Third rail guard cover (Stokes Molded Products) Jan 47  
 Track circuit shunting tested on electrification suburban line in Australia, Apr 18  
 Trains can reach 300 mph from 3rd rail pickup, Jan 43  
 35 foreign railroads report plans to spend \$270 million in '70, June 43  
**Electronic Industries Assn.**  
 RS-232-C interface between data and communications equipment, Nov 17  
**Elgin, Joliet & Eastern**  
 Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
**EMR Div. Weston Instruments Inc.**  
 Engineering Computers, 6000 series, Dec 39  
**Erie Lackawanna**  
 Plan to participate in the General Managers Assn. interchange and information network, Aug 27  
**ESE Limited**  
 48/QM narrow-band modem, Sep 56



Exide Power Systems Division, ESB Inc.

- Member of Storage Battery Section of NEMA, Apr 36
- Nickel-cadmium battery, Sep - Product Showcase

#### Facsimile

- FAX units located in yards of DT&I, Nov 34

#### Farinon Electric

- Four-wire bridge, Dec 39

#### Federal Communications Commission

- AAR opposes proposal of FCC to raise fees, July 34
- Consolidates three rate cases, July 42

- Data Transmission Co. proposes new wide microwave system, Jan 43

- Denies request to reconsider MCI approval for Chicago-St. Louis microwave, Apr 36

- Hears arguments on Telpak sharing, Mar 32

- Interconnection units should be certified, Nov 34

- Issues directives to clear the way for Western Union Telegraph Co. to acquire Bell System's teletype exchange service in 1971, Oct 43

- OKs unlimited Telpak/sharing, July 34

- Opponents seek full hearing on Datran's request to build microwave system, Aug 10

- Proposes 10 new radio channels to railroads, Oct 40

- Remand asked by Bell System Company of MCI case to FCC, Aug 10

- Sale of AT&T teletypewriter exchange service approved, Aug 11

- Sets docket on special communications services, Oct 40

- Southern Pacific supports data decision, Aug 11

- SP plans to file as communications common carriers, Feb 39

- Swamped with requests to provide proposed microwave services, June 45

- Telpak rate situation, Dec 12
- Telpak sharing order stayed up to 90 days, Nov 34

- Tentative decision issued on data firms, June 28

- Western Union to buy Bell System TWX, Mar 33

- Will manage radio spectrum regionally, June 39

#### Federal Railroad Administration

- Approves CTC for Chicago & Eastern Illinois, June 39

- Burlington Northern receives

- OK on CTC requests, Oct 44

- Change proposed for signal rules, June 24

- Chicago & North Western applies

- to FRA for approval to remove automatic train stop devices, Oct 40

- Contract awarded to AiResearch Corp. to design a linear induction motor for a tracked air cushion vehicle, July 43

- Favor revision of left hand signal rule, Dec 41

- Gives approval for CTC to MKT, June 43

- Grade crossings can be improved says study by Alan M. Voorhees Associates, June 40

- Lehigh Valley traffic control systems approved, Aug 11

- Man failure caused accident on Seaboard Coast Line, Feb 42

- Mitchell, M. B., Acting Director, Office of High Speed Ground Transportation

- Federal role will be increased in C&S research, Oct 20

- Penn Central gets relief to operate locomotives with either ATS or ACS cut out on 300 miles of line, Feb 39

- SCL has approval to install CTC in South Carolina, Feb 39

- Southern will upgrade signals, remove ATS, June 41

- Speed restrictions on tank cars carrying flammable gases, Dec 46

- Whitman, Reginald N., administrator, talks about signals and safety, June 39

- Florida East Coast Railway

- Hotbox detector usage explained June 39

- Ford Motor Company

- Lindberg, Victor L., Scientific Research Staff

- Improved flashing lights for highway crossing protection, Oct 18

- Installs detector station at Bowden Yard near Jacksonville, Fla. to spot hotboxes, wide loads, dragging equipment and loose wheels, Apr 36

- Friden Division, The Singer Company

- I/O data system, Sep 61

- Garrett Corp., The

- Devises system for power saving for MTA subway, June 42

- General Automation Inc.

- Glossary of commonly used computer terms, Sep 56

- General Battery Corp.

- Member of Storage Battery Section of NEMA, Apr 36

- General Cable Corporation

- Guide G10-04, June 35

#### General Data Comm Industries

- Offers service in data communications, Jan 42

#### General Electric Co.

- Computer usage on CTA, May 11

- CTA installs bus monitoring system, July 26

- CTA uses GE/PAC 4020 digital computer in bus monitor system, July 27

- Data Net 30 computers used by WP, Jan 18

- Data set, Apr 31

- Data systems bulletin ECD-11A, July 37

- Diginet data set, May 31

- GE/PAC 4000 process control computer in automatic classification yards at Alton & Southern, East St. Louis, Ill., July 16

- GE/PAC 4020 process control computer in automatic classification yards at Burlington Northern, Pasco, Wash;

- Penn Central, Selkirk, N.Y.; Penn Central, Columbus, Ohio, July 16

- Low light level TV has railroad use, Sep 68

- Microwave system, Feb 36

- PATCO runs trains automatically to serve Philadelphia, Mar 25

- Penn Central automates Columbus yard, Sep 16

- Penn Central uses its service at Buckeye classification yard, Columbus, Ohio, Oct 17

- Radio base stations, Mar 31

- Trains can reach 300 mph from 3rd rail pickup, Jan 43

- Two-way radio, June 34, 35

- General Managers Association of Chicago

- ACI interchange and information network proposal, Aug 26

- Editor's Corner urges adoption of ACI interchange and information network, Aug 42

- General Railway Signal Co.

- Canadian National orders CTC for mainline, Dec 40

- Crossing gate, Nov 30

- FSO track circuits, Oct 34

- Furnishes 10 sets of cab signal and speed control equipment for Cleveland Transit System Jan 42

- Great Northern will install CTC on 65 miles of line from Jennings to Stryker, Mont., Feb 40

- Magna Copper installs radio control switch machine, Feb 40

- Penn Central automates Columbus, Ohio classification yard, Sep 16

- Penn Central ups its service at Buckeye classification yard, Columbus, Ohio, Oct 17

- Radio controlled units help steel company, Dec 19
- Retarder contractor panels, Jan 46
- Retarder motor-control panel, Aug 34
- Sibley, H. D., Research Engineer
- Factors to be considered, Oct 21
- Speed control retarder, June 35
- Supplies NYCTA with ATC for 240 transit cars, July 34
- Switch machine, Mar 30
- Switch point detector, Feb 36
- Wheel thermo-scanner unit, Sep - Product Showcase
- Will supply equipment and controls for NYCTA, Mar 33
- General Signal Corporation
- Sells 51% interest in RACO to CCI Corp., Feb 42
- General Telephone & Electronics
- FCC asked to deny applications for microwave network, June 46
- German Federal Railroad
- Install Servo hotbox detectors, Dec 41
- German National Railways (Deutsche Bundesbahn)
- Orders hotbox detectors from Servo Corp. of America, Apr 36
- Gould Inc.
- Announces new corporate organization, Jan 42
- Member of Storage Battery Section of NEMA, Apr 36
- Grade crossing (See crossing protection)
- Grand Trunk Western
- Completes radio network in Michigan, July 42
- Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Graphic Sciences Corp.
- Facsimile units located in yards of DT&I, Nov 34
- Grasis Fabricating Co.
- Equipment shelter, Jan 46
- Graybar Electric Co.
- Creates new engineering department, Jan 43
- Great Northern (Also see Burlington Lines)
- Installs new facilities on 65 miles of line between Jennings to Stryker, Mont., Feb 40
- Orders Univac computers, Apr 36
- Griswold Signal Co.
- RACO celebrates 50th anniversary, Sep 54
- Gulf, Mobile & Ohio
- Extends microwave from Meridian Miss. to Fulton, Ky., Feb 39
- Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Hallcrafters Co.
- Data modem characteristics 186, CTDS-JPL, Apr 38
- HC-400 portable 2-way radio, July 36
- Two-way radio, Sep - Product Showcase
- Harmon Electronics Inc.
- Insulated joint checker, model 1501A, July 36
- Insulated joint checker, Sep 64
- MP uses AFTAC audio frequency track circuits at mainline scanner locations, Jan 35
- Hayden Book Co., Inc.
- Engineers' Relay Handbook, Aug 37
- Hayes Track Appliance Company
- Track appliance catalog, June 35
- Hazardous Material Regulations Board
- Speed restrictions on tank cars carrying flammable gases, Dec 46
- Hewlett-Packard Co.
- Mini-computer, Sep 56
- High Voltage Direct Current Transmission
- HVDC transmission line ready for service on Pacific Coast, July 18
- HVDC transmission may cause interference to communications circuits, Dec 28
- High water detectors (See detectors)
- Highway grade crossing (See crossing protection)
- Highway grade crossing protection, Jan 28
- Highway grade crossing safety (See crossing protection)
- Highway railroad grade crossing (See crossing protection)
- Hitachi Ltd.
- Provides automatic control for freight cars in classification yard in Japan National Railway, Aug 10
- Honeywell Data Products Division
- Data input system, Oct 34
- DDP-516 process control computer in automatic classification yards at: Burlington Northern, N. Kansas City, Mo.
- Canadian Pacific, Calgary, Alta.
- Missouri Pacific, Ft. Worth, Texas
- Norfolk & Western, Bellevue, Ohio
- Santa Fe, Argentine, Kansas
- Southern Pacific, Eugene, Ore., July 16
- DDP-516 process control computer at Santa Fe yard at Argentine, Kansas, July 12
- Hot journal detectors (See detectors)
- Hotbox detectors (See detectors)
- Housings
- Shelter equipment (Grasis Fabricating Co.) Jan 46
- Hysol Div., The Dexter Corp.
- Splice kits, Dec 38
- Illinois Central
- Pipas, George, Vice Pres. Communications and Computer Services
- Data exchange discussed, Oct 29
- Illinois Commerce Commission
- Speed restriction on tank cars carrying flammable gases, Dec 46
- Illinois Northern
- Plan to participate in the Gen. Managers Assn. ACI interchange and information network, Aug 27
- Indiana Harbor Belt
- Plan to participate in the Gen. Managers Assn. ACI interchange and information network, Aug 27
- Inductive Coordination
- Essential where HVDC transmission occurs, July 18
- HVDC may cause interference to communications circuits, Dec 28
- Information Retrieval
- Southern Pacific gets waybill data fast from video tape system, May 24
- How information retrieval systems operate, May 26
- Intercommunications
- Long Island installs public address system in 33 stations, Dec 40
- Input/Output Devices
- Analog and digital units in process control computers, July 17
- ASR data terminal (Peripheral Data Machines Inc.) Sep - Product Showcase
- Computer-communications terminal (Data Products Corp.) Sep - Product Showcase
- Data systems Division issues terminal specs, Sep 47
- Data terminal (Oneida Electronics Inc.) Mar 31
- Document reader (Motorola Instrumentation & Control Inc.) Jan 48
- Graphics terminal (Monitor Displays) Dec 38



I/O data system (Friden Div., The Singer Co.) Sep 61  
 Keyboard input system (Computer Machinery Corp.) Sep - Product Showcase  
 Keypset, pushbutton (Automatic Electric Co.) Jan 44  
 Magnetic tape data terminals (Teletype Corp.) Sep - Product Showcase  
 On-line terminal (Burroughs Corp.) Sep - Product Showcase  
 Recording/transmitting typewriter (Data Instruments Co.) Sep - Product Showcase  
 Remote data terminal (Wyle Computer Products) Sep - Product Showcase  
 ROCR System/70 (Cognitronics Corp.) Sep - Product Showcase  
 Terminal, 820/03 (Victor Computer Corp.) Sep - Product Showcase  
 Terminal CRT (Transistor Electronics Corp.) Jan 46  
 Terminal, magnetic tape (Teletype Corp.) Aug 34  
 Video communication terminal (American Data Systems) Sep - Product Showcase  
 Video terminal (Video Systems Corp) Sep 62  
 Institute of Electrical & Electronic Engineers  
 Electrification top item at April meeting, Mar 32  
 Impact on signal and communications facilities described at ASME/IEEE meeting, May 21  
 Institute for Rapid Transit  
 Mass transit extends computer applications, May 11  
 Instrument Casings (See Housings)  
 Intercom systems, Jan 24  
 Interlocking  
 Southern installs new facilities at Birmingham, Feb 40  
 Interlockings, Jan 28  
 Intermodal Transportation Systems Inc.  
 Order obtained from IC for installation of terminal control system at its Intermodal Exchange, Chicago, July 34  
 Works with Computer Identics on intermodal TOFC/COFC terminals, Sep 19  
 International Business Machines  
 Computer programs called Tariff Publishing System and Traffic Profile Analysis System helps shippers and railroads, May 37  
 IBM 1800 process control computer in automatic classification yard at: Southern Pacific, Houston, Texas  
 Union Pacific, N. Platte, Neb.

Illinois Central computers handle batch data processing and message dispatching, Apr 14  
 Model 360/30 computer installed in automatic freight classification yards, July 12  
 Model 360/65 computer to handle AAR network model, Sep 51  
 Sets up test center for teleprocessing, Jan 42  
 International Communications Corp. Data set, Dec 38  
 International Correspondence Schools  
 New FCC commercial radio telephone license course announced, July 42  
 International Symposium on Railway Cybernetics, July 20  
 Itek Business Products  
 Microfilm system, Dec 39

How tests were conducted to find wheel-to-rail resistance in electrification suburban testing near Melbourne, Australia, Apr 26  
 Hysol Div., The Dexter Corp.  
 Splice kits, Dec 38

Japan National Railway  
 Yard braking system to be tested, Aug 10

Kameco Electronics Ltd.  
 Telemat automatic dialer, Sep - Product Showcase  
 Kerite Company  
 Power cable bulletin, Sep - Product Showcase  
 Kershaw Manufacturing Co., Inc.  
 Brush cutter, May 31  
 Klein, Mathias & Sons Inc.  
 Cable cutter, Nov 33  
 K-W Battery Co. (Subsidiary of Westinghouse Electric Corp.)  
 Member of Storage Battery Section of NEMA Apr 36

Lehigh Valley Railroad  
 FRA approves traffic control systems, Aug 11  
 Lenkurt Electric Co.  
 D5RGW installs 46A carrier to control VHF radio stations, Feb 28  
 Data communications set, June 35  
 Data set, Aug 34

Data system, Dec 38  
 Illinois Central Chicago - New Orleans microwave, Apr 13  
 Microwave systems, Sep - Product Showcase  
 WP installs microwave in California, Jan 21  
 Western Pacific microwave in service at Sacramento-Portola, Calif., Nov 27

Letters  
 Our New Look, July 39, Aug 37  
 Lightning Protection (See Safety)  
 Linear induction motor developed for vehicle, Jan 42  
 London Transport, Great Britain  
 14-mile Victoria line has automatic train operation in service for one year, May 35  
 Long Island Railroad  
 Communications for metropolitan commuter cars, Aug 17, 20  
 Crossing program extended, Dec 41  
 Extends electrification, 16 miles, Dec 41  
 Places \$420,000 two-way radio order with Radio Corp. of America, July 42  
 Public address systems installed in 33 stations, Dec 40  
 Starts signal training course, Feb 39

Loose wheel detectors (see detectors)

Los Angeles Department of Airports  
 DOT grant authorized for study of tracked air cushion vehicles, Aug 10

Los Angeles Water & Power District  
 HVDC transmission may cause interference to communications circuits, Dec 28

Open-wire line systems may be affected by HVDC transmission, July 18

Louisville & Nashville  
 Alward, S. A. Director Management Information Services  
 Batch processing lesson of 60's, Oct 30

Classification yard upgraded with new master retarder, Aug 13

Communications men are trained, Oct 15

Four railroads share car movement data, Sep 68

Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27

Lynch Communications Systems  
 Inband signaling, Mar 30  
 Data set, July 36  
 Data terminal, June 34  
 Filter assemblies, May 31  
 Line repeater units, Oct 38  
 Negotiations for merger have stopped, Aug 11  
 Pacific Plantronics Inc. to merge, June 39

- Magna Copper Co.  
Switch machine will be remotely controlled by radio, Feb 40
- Magnavox Corp.  
Facsimile units located in yards of DT&I, Nov 34
- Maintenance  
Bow-ty cable (Panduit Corp.) Sep 64  
Brush cutter (Kershaw Manufacturing Co., Inc.) May 31  
Care of nickel-cadmium batteries, Aug 24  
Classification yard maintenance includes importance of signaling and communications maintenance discussed, Aug 12  
Fencing (Copperweld Steel Co.) June 34  
Illinois Central equipment technicians maintain microwave, Apr 14  
Insulated joint checker (Harmon Electronics Inc.) Sep 64  
Santa Fe Railway finds a better way for communications maintenance, June 18  
Wheel-to-rail resistance test made in electrification suburban testing on Victorian Railways near Melbourne, Australia, Apr 26  
Wire cutter (American Pamcor Inc.) Sep 62
- Management Information  
ACI-Communications interface standard, Nov 14  
Automatic classification yards require management's support for skilled maintenance personnel to provide continuing inspection and testing, Aug 13  
Automatic train stopping has been developed for rapid transit, May 18  
BART controls "dry run" tested, May 13  
Benefits of ACI, Mar 22  
Canadian National connects ACI to mini-computer, Dec 14  
Change proposed for signal rules, June 25  
CN keeps traffic moving in Toronto via CTC, Feb 19  
Communication & Signal Section AAR annual meeting in San Francisco discusses hotbox detector operation and remote control of slave locomotives, Oct 18  
Communications maintenance on Santa Fe, June 19  
Computer Identics uses printer providing readout from ACI test site, Sep 18  
CTA installs monitoring system, July 26  
D&RGW has dispatcher-control of radio stations over entire system, Feb 26
- Electrification outlook is good for U.S., Mar 14  
FCC says data processing and service bureau type operations, per se, should not be regulated, June 29  
HVDC transmission may cause interference to communications circuits, Dec 28  
Illinois Central centralizes controls at Chicago headquarters, Apr 14  
Lessons of the 60's is closing the communications gap between the manager and data processing expert. Outlook for the 70's is data exploitation, Oct 28  
MP installs five ACI scanners at Dupon, Ill. yard, Jan 33  
Open wire line systems may be affected by HVDC transmission, July 18  
PATCO runs trains automatically to serve Philadelphia, Mar 24  
Penn Central automates Columbus, Ohio classification yard, Sep 14  
Planning and implementing WP's management information and control system was handled by computer and systems experts, Jan 16  
Process control computer installed in automatic freight classification yard at Santa Fe at Argentine, Kansas, July 13  
S&C officers will ask for more money in 1970 to install new equipment and systems, Jan 22  
Simulation of automatic classification yard using digital computer beneficial for Penn Central, July 22  
Southern management involved in processing, May 27  
Southern Pacific gets waybill data fast from video tape system, May 24  
Track circuit shunting tested in suburban territory near Melbourne, Australia, Apr 18  
Train-stop criteria for hotbox detectors, Nov 22  
Twenty-two railroads in Chicago Terminal area are now studying a proposal made for installation of an automatic car identification interchange and information network, Aug 27  
Two-way radio, intercommunications and public address systems are being employed by transit authorities and commuter railroads, Aug 16
- Management Information Services (MIS)  
Missouri Pacific & Texas up-grade communications facilities, Feb 41
- Management Services  
Management information and control systems (MICS) Jan 16  
MKT establishes management information service group, Feb 40
- Manufacturer's Junction  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27
- Mark Products Co.  
Supplies antennas for 685-miles of Santa Fe microwave, Mar 33
- Marquardt Industrial Products Co.  
Dispatcher's consoles for VHF base station control on D&RGW, Feb 29  
Hursh, C. M., Former Systems Applications Engineer  
Halts modulation controls for signaling, Nov 28  
Pierce, P. E., Manager Midwestern Region  
Track circuit: Pulse modulated controls, Oct 26  
RACO celebrates 50th anniversary, Sep 54
- Massachusetts Bay Transit Authority  
Communications for rapid transit cars, Aug 18, 21  
McDonnell Automation Co.  
Computer program simulates large, heavy loads moving over rail lines, Apr 40
- McGraw-Hill Book Co.  
Management Information Systems Handbook, July 44
- McKinsey & Co., Inc.  
Neuschel, Robert P., Senior Partner  
How to obtain more computer capability, Oct 29
- MCI-North Central States  
Proposed microwave system, St. Paul - Chicago, Feb 8
- Metropolitan Transportation Authority  
Power saving system for subway looked into, June 42
- Microwave, Jan 24  
Microwave  
Communications spending rises, Dec 11  
D&RGW provides VHF radio station control, Feb 26  
FCC swamped with requests to provide proposed microwave services, June 45  
GM&O installs system from Meridian, Miss. to Fulton, Ky., Feb 39  
Illinois Central Chicago-New Orleans system in service, Apr 13  
Illinois Central & Southern Pacific exchange microwave channels, Apr 14



- Maintenance procedures discussed, Aug 15  
MCI proposes St. Paul - Chicago system, Feb 8  
Microwave in service at Sacramento-Portola, Cal., Nov 27  
Microwave radio relay system (Collins Radio Co.) Sep 58  
Microwave system (General Electric Communications Products Dept.) Feb 36  
Microwave systems (Lenkurt Electric Co., Inc.) Sep - Product Showcase  
Microwave system (Motorola Communications & Electronics Inc.) June 35  
Microwave uses pulse code modulation, Sep 21  
Multiplex system (Canadian Marconi) Sep 60  
New large common carrier systems proposed by Data Transmission Co., Jan 43  
Path loss testing service (Microwave System Co.) Sep 57  
Philco Ford Corp. to enter microwave business, Feb 42  
Santa Fe system near completion Mar 33  
Southern Pacific plans to file as communications common carrier, Feb 39  
Southern Pacific will extend system to East St. Louis, Feb 41  
WP installs 180-mile system in California, Jan 21  
Microwave Communications Inc.  
Earlier decision by FCC approves plans for microwave services, June 46  
Receives FCC approval on its Chicago-St. Louis microwave system, Apr 36  
Remand asked by Bell System Companies of MCI case to FCC, Aug 10  
Microwave Systems Company  
Path loss testing service, Sep 57  
Midwest Research Institute  
Benson, W. R., Director Economics & Management Science Div.  
AAR network model is in final stages, Sep 50  
Milwaukee Road  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
Miscellaneous  
Display modules (Conrac Corporation) Dec 39  
Microfilm system (Itek Business Products) Dec 39  
Optical reader (Varian Data Machines) Dec 39  
Miscellaneous signal units, Jan 29  
Missouri-Kansas-Texas  
Approval won from FRA for CTC, June 43  
Establishes management information services department, Feb 40  
Missouri Pacific Railroad  
Communications for MIF are upgraded, Feb 41  
Continues ACI test, Jan 32  
Develops car control system for terminals and customers, Apr 42  
Honeywell DDP-516 process control computer in automatic classification yard at Ft. Worth, Texas, July 16  
Installs ACI and upgrades Lancaster Yard at Ft. Worth, Texas, Feb 41  
Sines, G. S., Director Information and Control Systems  
Data systems should support railroad operation, Oct 31  
Will continue testing of ACI system, Feb 23  
Models, mathematical or computer developed (See Cybernetics)  
Modems (See Data Sheets)  
Modern Supply Co.  
Appointed sales representative for switch heaters by White Manufacturing Co., Jan 43  
Mohawk Data Sciences Corp.  
Communications Adaptor, Sep - Product Showcase  
Monitor Displays  
Graphics terminal, Dec 38  
Monon  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
Mosler Safe Co.  
Installation and field service organization named representative for ACI equipment by WABCO, July 43  
Motorola Inc.  
CCTV cameras, Sep - Product Showcase  
CTA installs bus monitoring system, July 26  
Illinois Central has dispatcher control of base radio station, Apr 16  
Integrated circuits, Oct 20  
Low light level TV has railroad use, Sep 68  
Microwave system, June 35  
Schwendeman, Robert J., Manager of Engineering, Portable Specialties Products  
Transit communications has radio, intercoms, Aug 16  
Two-way radio, Mar 30  
Motorola Instrumentation & Control Inc.  
Document reader, Jan 48  
Multiplex Communications Inc.  
Solid-state relay, Mar 31  
Muskingum is an automatic electric railroad, Mar 13, 17  
National Academy of Sciences  
Interconnection units should be certified, Nov 34  
National Cash Register Company  
Line printer, Sep 56  
National Electrical Manufacturers Association  
Storage battery section formed, Apr 36  
Nationwide Electronic Systems Inc.  
Code converter, June 34  
New York City Transit Authority  
Automatic train control on 240 transit cars, July 34  
Awards contract for Coney Island Yard controls of WABCO, SSC Div., Apr 36  
Centralized radio repair, Aug 14  
Communications for subway rolling stock, Aug 17, 20  
Orders signal equipment for yard, Mar 33  
Nife Inc.  
Adcour as sales representative for New England, Apr 44  
Battery charger, May 31  
Battery converter, Sep 62  
Lindsay, A. H., Service Engineer  
Care for nickel-cadmium batteries, Aug 24  
Noller Control System  
Illinois Central microwave alarms centered at Chicago, Apr 14  
Norfolk & Western Railway  
Hesser, J. M., Assistant Manager Communications & Signals  
Train-stop criteria for hotbox detectors, Nov 22  
Honeywell DDP-516 process control computer in automatic classification yard at Bellvue, Ohio, July 16  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
North American Philips  
Data modem characteristic 186 8AA 99/11FM, Apr 38  
Data modem characteristic 188 600/1200 Baud Data Set, 2400/4800 Baud Data Set, June 38  
Data modem characteristic 189, DD2001 and DD2002, July 32  
Novation Inc.  
Data couplers, Sep 57  
Okonite Company  
Moves Wire & Cable Div. to Ramsey, N.J., Apr 42

Oneida Electronics Inc.  
Data terminal, Mar 31  
Operations Research  
Railroads exchange information on analytical techniques, Sep 52  
Oregon Technical Products  
Receives license for hotbox detector, Nov 34  
Output Device  
Digital plotting systems (California Computer Products Inc.) Sep - Product Showcase  
Line printer (The National Cash Register Co.) Sep 56  
Overheated journal detector (See detector)  
Over voltage protection (See Safety)

Pacific Plantronics  
Negotiations for merger have stopped, Aug 11  
Will merge into Lynch Communications Systems Inc., June 39  
Panduit Corp.  
Appoints Ransom Sales Co., Inc. sales representative, July 34  
Bow-ty cable, Sep 64  
Opens new office in Texas, June 42  
Wiring harness jig board, July 37

Penn Central Transportation Co.  
Automates Columbus, Ohio classification yard, Sep 14  
Electrification study made, Mar 16  
General Electric GE/PAC 4020 process control computer in automatic classification yard at Columbus, Ohio and Selkirk, N.Y., July 16  
Mehl, R. H. Senior Operations Research Analyst  
Modeling via computer aids yard design, July 21  
Penn Central gets relief to operate locomotives with either ATS or ACS cut out on 300 miles of line, Feb 39  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
Shih, R. C., Sr. Operations Research Analyst  
Modeling via computer aids yard design, July 21  
Telpak sharing order stayed up to 90 days, Nov 34  
Ups capacity to handle phone calls, June 39  
Ups service in classification yards, Oct 17  
Peripheral Data Machines Inc.  
PDM 6633 ASR data terminal, Sep-Product Showcase

Phelps Dodge Communications Products Co.  
VHF base station antenna yagi and omni-directional units on Illinois Central, Apr 16  
Philadelphia Electric Co.  
Shew, E. B., Chairman EEI task force and assistant to vice-president, research and development  
Technical aspects of electrification, Mar 16  
Philco-Ford Corp.  
Installing yard train controls for Bay Area Rapid Transit, July 42  
Will enter microwave communications system business, Feb 42  
Pitman Manufacturing Co.  
Digger/Derricks, Oct 34  
Plat General  
Tone-pulse selective calling, Sep - Product Showcase  
Pole line cable construction, Jan 25  
Port Authority Transit Corp.  
PATCO runs trains automatically to serve Philadelphia, Mar 24  
Power Conversion Products Inc.  
Battery charger, Sep 64  
Power Supplies  
Automatic power system (Continuous Computer Power Inc.) Sep - Product Showcase  
Battery/converter bulletin (Nife Inc.) Sep 63  
Micro power system (United States Motors Corp.) Feb 36  
Modular power supply (Tele-Dynamics) Apr 31  
Process Control Computers  
BART uses two Westinghouse Prodac 250 computers, May 16  
Programming (see software)  
Public Address System  
Long Island installs public address system in 33 stations, Dec 40  
Publisher's Note  
A new name, a new image - better service, Apr 46  
Puleo Electronics Co., Inc.  
Interlockings at Penn Central Columbus, Ohio yard are remote controlled, Sep 16  
Pulse Communications Inc.  
Monitoring device, Sep 67

RACO  
Railroad Accessories Corp. celebrates 50th anniversary, Sep 54  
Radio  
Bin loop recorder reproducers used at 27 hotbox detector locations to provide recorded messages to passing train crews, July 23  
Burlington Northern orders ra-

dio units from S&C Div.  
WABCO, Aug 11  
Communications spending rises, Dec 11  
CTA installs bus, monitoring system, July 26  
D&RGW has dispatcher-control of stations over entire system, Feb 26  
Digital decoder (Secode Electronics) Mar 31  
FCC proposes 10 new channels for railroads, Oct 40  
Grand Trunk Western completes radio network in Michigan, July 42  
Illinois Central dispatchers control mainline stations, Apr 14  
Long Island places \$420,000 two-way radio order with Radio Corp. of America, July 42  
Magna Copper installs radio control switch machine, Feb 40  
PATCO rapid transit lines uses train phone systems near Philadelphia, Mar 28  
Radio base stations (General Electric) Mar 31  
Radio control is helping locomotives, Oct 23  
Radio controlled units help steel company, Dec 19  
Radio extension set (Secode Electronics) Jan 46  
Radio installed on 30 locomotives of Seaboard Coast Line, Aug 11  
Radio repair centralized by New York City Transit Authority, Aug 14  
Santa Fe maintains practices, June 18  
Series 700 mobile radios installed on Union Pacific, July 42  
75 locomotives of C&O/B&O furnished with radio, Aug 11  
Transit communications has radio, intercoms, Aug 16  
Two-way radio, Jan 24  
Two-way portable radio (The Hallicrafters Co.) July 36  
Two-way radio (General Electric Mobile Radio Dept.) June 35  
Two-way radio (The Hallicrafters Co.) Sep - Products Showcase  
Two-way radio (Motorola Inc.) Mar 30  
Two-way UHF radio (General Electric Co.) June 34  
Radio Corporation of America  
\$420,000 order for two-way radio received from Long Island Railroad, July 42  
Low light level TV has railroad use, Sep 68  
Series 700 mobile radios to be installed on Union Pacific, July 42



Railroad Accessories Corp.  
Acquires T. Geo. Stiles Company, June 48  
CCI acquires RACO stock, Feb 42  
Conversion units, Nov 30  
Crossing relay, Mar 30  
Interlocking & CTC panels, June 35  
Long Island extends crossing program, Dec 41  
RACO celebrates 50th anniversary, Sep 54  
Snow melter, Sep - Product Showcase  
Solid-state flasher, Jan 44  
Rails Co.  
Switch heater, Sep 62  
Railtron Corp.  
Oregon Technical gets license for hotbox detector, Nov 34  
Ransom Sales Co.  
Appointed sales representative by Panduit Corp., July 34  
Rapid Transit  
Automatic train stopping has been developed for rapid transit, May 18  
Brussels, Belgium subway installs ACI for better service, Feb 32  
CTA installs bus monitoring system, July 26  
14-mile Victoria line, Great Britain, has automatic train operation in service for one year, May 35  
Mass transit extends computer applications, May 11  
PATCO runs trains automatically to serve Philadelphia, Mar 24  
Washington Metropolitan Transit Authority requests bids for train control of Washington DC subway, Aug 11  
Reach Electronics Inc.  
Encoder, Sep 59  
Reading Company  
Extends electrification, June 40  
Rectifiers  
Battery chargers (Thomas A. Edison Industries, Primary Battery Div.) Jan 48  
Battery charger (Nife Inc.) May 31  
Battery charger (Power Conversion Products Inc.) Sep 64  
Relays  
Factors to be considered, Oct 21  
Solid-state relay (Multiplex Communications Inc.) Mar 31  
Telegraph relay (Trepac Corp. of America) June 34  
Remote control  
Radio controlled units help steel company, Dec 19  
Resistance  
Wheel-to-rail measurements made in electrification suburban testing in Australia, Apr 18  
Retarder yards (See yards)

RFL Industries Inc.  
Data modem characteristics 184, 22DB/EIA, 13 AO/TTY & 13 AA/TTY, Jan 38  
Data modem characteristics 185, 32 DT/EIA, 32 DR/EIA, Feb 33  
Data modem characteristics 187, 4000, 3227, May 34  
Rixon Electronics Inc.  
Data set, Sep 56  
Rock Island  
Extends direct dial phones, Feb 40  
Johnson, W. B., Signal Engineer  
Pulse modulated controls for block signaling, Oct 23  
Safety  
Surge protectors (Siemens America Inc.) Mar 31  
Safety detectors (see detectors)  
Safety devices  
Track appliance catalog -derails (Hayes Track Appliance Co.) June 35  
Sams, Howard W. & Co., Inc.  
Fundamentals of Digital Computers, July 44  
San Francisco Bay Area Rapid Transit District (See BART)  
Sangamo Electric Co.  
Data modems, Mar 31  
Data set, Sep 58  
Transitel Computer Support System moves to Denver, Colo., Aug 11  
Santa Fe  
Automated yard at Argentine, Kansas is opened, July 12  
Better way for communications maintenance found, June 18  
Crouch, C. A., Supt. of Communications-system  
How to use ACI interface, Nov 14  
Honeywell DDP-516 process control computer in automatic classification yard at Argentine, Kan., July 16  
Massie, H. L., Assistant Superintendent Communications-System  
Radio control is helping locomotives, Oct 23  
Microwave net near completion, Mar 33  
Orders 9 ACI systems for KC yard, Nov 34  
Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27  
Science Management Group, WOFAC Co.  
Crane, R. R. Group Vice Pres.  
Computers widely used by manager, Oct 31  
Seaboard Coast Line  
Bin loop recorder reproducers used at 27 hotbox detector locations to provide recorded messages to passing train crews, July 23

Four railroads share car movement data, Sep 68  
Installs ACI scanners, Aug 11  
Men failure cause of accident, Feb 42  
Orders solid-state radio units, Mar 33  
Osborn, Prime F. III, President  
Key to service, Oct 29  
Radios to be installed on 30 locomotives, Aug 11  
SCL has approval to install CTC in South Carolina, Feb 39  
Secode Electronics  
Digital decoder, Mar 31  
Radio extension set, Jan 46  
Selector, June 35  
Servo Corp. of America  
German Federal Railroads, British Railway & Canadian National install hotbox detectors, Dec 41  
Sells hotbox detectors to German National Railways, Apr 36  
Siemens America Inc.  
Electro-dynamic retarder, Jan 44  
Surge protectors, Mar 31  
Wheel protector, Apr 31  
Signal & Communications Division of WABCO (See WABCO)  
Signal equipment  
Retarder motor-control panel (General Railway Signal Co.) Aug 34  
Switch heaters (White Manufacturing Co.) Aug 34  
Signal equipment installed 1965-1969, Jan 31  
Signal maintenance (See maintenance)  
Signal principles defined, Mar 18  
Signaling  
Change proposed for signal rules, June 24  
Define principles outlined by C&S Section AAR, Mar 18  
Halts modulation controls for signaling, Nov 28  
Impact on signal and communications facilities described at ASME/IEEE meeting, May 21  
Signal spending in 1970 to hit \$45.4 million, Jan 22  
35 foreign railroads report plans to spend \$270 million in '70, June 43  
Whitman, Reginald N., Administrator FRA talks about signals and safety, June 39  
Signaling in 1969:  
Block signals and traffic control, Jan 28  
Electric switch lamps, Jan 29  
Highway grade crossing protection, Jan 28  
Interlockings, Jan 28  
Miscellaneous signal units, Jan 29  
Safety detectors, Jan 29  
Slide fences, Jan 29  
Spring switches, Jan 29  
Switch heaters, Jan 29

## Signals

Conversion units (Railroad Accessories Corp.) Nov 30

## Simpson Electric Co.

Digital instruments bulletin 368B, July 36

Multimeter, Nov 33

## Simulation

Southern makes use of operations simulation on the computer, May 29

## Simulation Techniques (See Cybernetics)

## Singer Company

Business computer, Oct 34

Meter/signal generator, Sep 63

## Slide fences, Jan 29

## Software (Programming)

Computerized car tracing

(Xenex Corporation) Sep 56

Western Union awards contract for software to upgrade company facilities, Feb 41

## Soo Line

Plan to participate in the General Managers Assn. ACI interchange and information network, Aug 27

## Southern Pacific Communications Co.

FCC swamped with requests to provide proposed microwave services, June 45

Interconnection units should be certified, Nov 34

Opposes Datran request to build microwave system, Aug 10

Supports FCC data decision, Aug 11

## Southern Pacific Transportation Co.

Cetinich, J. N., Manager Analytic Services

Network model is in final stages, Sep 50

Computer program simulates large heavy loads moving over rail lines, Apr 40

Electrification study made, Mar 16

Forms communications subsidiary Dec 12

Germany, J. W., General Manager System Management Services

Communications/computer

systems will be exploited

by railroads, Oct 31

Honeywell DDP-516 process control computer in automatic classification yard at Eugene, Ore., July 16

How information retrieval systems operate, May 26

IBM 1800 process control computer in automatic classification yard at Houston, Tex., July 16

Looks at electrification between Colton, Cal., and El Paso, Tex., Oct 43

Microwave will be extended to East St. Louis, Feb 41

Plans to file for communications net, Feb 39

Spence, R. D., Vice-President System Operations

Efficient transportation

needs C&S efforts, Oct 18

Waybill data received fast from

video tape system, May 24

Will upgrade signals; remove

ATS, June 41

## Southern Railway

Clayton, W. Graham, Jr., Pres.

Management involvement in

systems and computer activ-

ity, Oct 28

Four railroads share car move-

ment data, Sep 68

Hewett, H. M., Communications

Engineer

Radio control is helping

locomotives, Oct 23

Installs new interlocking in

CTC at Birmingham and be-

tween Ludlow, Ky. and Chat-

tanooga, Tenn., Feb 40

Jones, John L., Vice Pres.,

Management Information Services

Efficiency upped via EDP,

May 27

Management involved in EDP,

May 30

Pace, N. C. Assistant to

vice-president communications

Train-stop criteria for

hotbox detectors, Nov 22

SPLC (Standard Point Location Code)

ACI freight car labeling, Oct

32

Spokane, Portland & Seattle Rail-

way (Also see Burlington Lines)

Spring switches, Jan 29

Stewart-Warner Electronics

Receives BART \$5 million infor-

mation systems contract, Nov

34

Stiles, T. Geo. Company

Acquired by RACO, June 48

Stokes Molded Products

Third rail guard, Jan 47

Stromberg Carlson Corp.

B&O installs electronic switch-

board at Cumberland, Md.,

Dec 40

Dispatchers, phone circuits

and 4-wire switching in-

stalled on Illinois Central,

Apr 16

Enlarged telephone network on

Burlington Northern, Dec 13

New telephone switchboard on

B&O, Dec 12

PATCO runs rapid transit trains

automatically, Mar 28

Switching processor, Feb 36

Surge Protection (See Safety)

## Switches

Detector, switch point (Gener-

al Railway Signal Co.) Feb

36

Snow melter (Railroad Accessor-

ies Corp.) Sep - Product

Showcase

Switch machine, electric (Gen-

eral Railway Signal Co.)

Mar 30

Switch heater (The Rails Co.)

Sep 62

Switch heaters, Jan 29

Sylvania Electric Products Inc.

Contract for 18 KarTrak ACI

systems awarded by Detroit,

Toledo & Ironton, Oct 43

KarTrak ACI installed in Brus-

sels, Belgium subway, Feb 32

Low light level TV has railroad

use, Sep 68

MP purchases five ACI scanners,

Jan 35

Order for ACI system received

from Canadian National, Aug

11

Santa Fe awards contract for

9 ACI systems to Commercial

Electronics Div., Nov 34

Syntonic Technology Inc.

Expands service via acquisi-

tions, June 40

Provides service for railroads,

Mar 33

## System Control

Illinois Central moves controls

to headquarters for efficien-

cy, Apr 13

## System Engineering

General Managers Association of

Chicago ACI interchange and

information network, Aug 28

## TAB Books

Electronic Circuit Design Hand-

book, 3rd edition, Aug 37

Electronic Test & Measurement

Handbook, 2nd edition, Aug

37

1970 Popular Tube/Transistor

Substitution Guide, July 44

Solid-State Circuit Design &

Operation, July 44

TEC Inc. (Transistor Electronics Corp.)

Provides display boards for

BART transit system, May

16

Tele-Dynamics, Division of Ambac

Industries Inc.

Data set, Sep 59

FSD converter, June 34

Modular power supply, Apr 31

Telegraph terminal, May 31

## Telegraph

Data set (Sangamo Electric Co.)

Sep 58

Telegraph terminal (Tele-Dyna-

mics) May 31

Telephone, Jan 24

## Telephone

Communications spending rises,

Dec 11

Dial selector (Secode Electron-

ics) June 35

Illinois Central extends direct

distance dial service, Apr

16

Penn Central ups capacity to

handle phone calls, June 39



- Rock Island extends direct dial phones, Feb 40  
 Selective signaling (Wescom Inc) Sep 56  
 Switching processor (Stromberg-Carlson Corp.) Feb 36  
 Telemat automatic dialer (Kameco Electronics Ltd.) September Product Showcase  
 Tone-pulse selective calling (Plat-General) Sep - Product Showcase  
 Touch-tone receiver modules (Bramco Controls Div. Ledex Inc.) Sep 65  
 Teleprinters, Jan 25  
 Teletype Corporation  
 Computer I/O units used by WP, Jan 18  
 Detroit & Toledo Shore Line has realtime computing, Dec 22  
 Illinois Central yards and offices report via teletype, Apr 16  
 I/O units at Santa Fe automatic classification yard at Argentine, Kansas, July 12  
 Magnetic tape data terminals, Sep - Product Showcase  
 Magnetic tape terminals, Aug 34  
 MP tests ACI at Dupon, Ill. yard Jan 32  
 Printer provides readout from ACI test site for Computer Identica, Sep 19  
 TWX plus Telex equals more competition, June 40  
 Television  
 CCTV camera (Motorola Communications & Electronics Inc.) Sep - Product Showcase  
 Light amplification techniques uses low light level, Sep 68  
 Telpak  
 Has interest for AT&T railroads Feb 8  
 Rate increases effective Feb. 1, Mar 32  
 Rate situation before FCC, Dec. 12  
 Rates are now competitive, July 34  
 Sharing order stayed up to 90 days, Nov 34  
 Terminal Systems Inc.  
 Developing and marketing piggyback terminal controls systems for IC, July 34  
 Test Equipment  
 Data terminal interface test set (Dataprobe Inc.) Aug 34  
 Digital instruments bulletin 368B (Simpson Electric Co.) July 36  
 Environment monitors (Western Union Computer Utilities) Nov 30  
 Leak detector (E.F.I. Inc.) Nov 30  
 Meter/signal generator (The Singer Co.) Sep 63  
 Multimeter (Simpson Electric Co.) Nov 30  
 Monitoring device (Pulse Communications Inc.) Sep 67  
 Power Guard (Western Union Computer Utilities Inc.) Sep-Product Showcase  
 Spectrum analysis on open wire carrier on Union Pacific to measure interference from high voltage direct current, Dec 31  
 Test set (James G. Biddle Co.) Sep 65  
 Volt-ohm-milliammeter (Triplett Corp.) Sep 66  
 Voltage transient monitor (Data Research Corp.) Sep 67  
 Texas and Pacific (See Missouri Pacific)  
 Texas Instruments  
 Low light level TV has railroad use, Sep 68  
 TOFC/COFC  
 Label rules for ACI to be eased, July 35  
 Track Circuits  
 Insulated joint checker (Harmon Electronics Inc.) July 36  
 Oscillation of wheels effects track shunting, Apr 30  
 Shunting system (W. T. Cox Co.) Jan 47  
 Shunting tested on electrified suburban line in Australia, Apr 18  
 Track circuit (Westinghouse Air Brake Co., Signal & Communications Div.) July 37  
 Traffic control system (See CTC)  
 TRAIN (Tele-Rail Automated Information Network)  
 ACI freight car labeling, Oct 32  
 Transit Computer Support Systems Div. of Sangamo Electric  
 Moves to Denver, Colo. Aug 11  
 Transistor Electronics Corp.  
 CRT terminal, Jan 46  
 Transport Products Co.  
 RACO celebrates 50th anniversary, Sep 54  
 Trepac Corporation of America  
 Telegraph relay, June 34  
 Trepac Corporation, Datatone Div.  
 Datatone RTCT, Dec 39  
 Triplett Corp.  
 Volt-ohm milliammeter, Sep 66  
 TV Recordings (see video recording)  
 UMLER (Universal Machine Language Equipment Register)  
 ACI freight car labeling, Oct 32  
 Union Carbide Corp.  
 Primary batteries, June 35  
 Union Pacific Railroad  
 Conducts tests on open wire communications line in vicinity of HVDC transmission line in Oregon and Washington, July 20  
 Electrification study made, Mar 16  
 IBM 1800 process control computer in automatic classification yard at North Platte, Neb., July 16  
 Jorgensen, J. L., Director Management Information Services  
 Discusses data exchange, Oct 29  
 Radio on rolling stock replaced July 42  
 Robertson, Hugh M., Asst. to Supt. Communications  
 HVDC transmission line ready for service on Pacific Coast, July 18  
 HVDC transmission may cause interference to communications circuits, Dec 28  
 United Business Communications Inc.  
 Multiplex, Sep 60  
 United States Motors Corporation  
 Micro power system, Feb 36  
 United States of America Standards Institute  
 USA standards for communications and computer control IO terminal specs issued by AAR, Sep 47  
 Univac Corp.  
 Detroit & Toledo Shore Line has realtime computing, Dec 22  
 Model 1107 and 1108 computers to handle AAR network model, Sep 51  
 Order received from Great Northern, Apr 36  
 Varian Data Machines  
 Optical reader, Dec 39  
 Vapor Corporation  
 Transportation sales reorganized, July 34  
 Vapor Corporation, Rail & Transit Division  
 Renamed Transportation Systems Division, Feb 8  
 Victor Comptometer Corp.  
 820/03 terminal, Sep - Product Showcase  
 Victorian Railways  
 Track circuit shunting tested on electrified suburban line, Apr 18  
 Video recording  
 How information retrieval systems operate, May 26  
 Southern Pacific gets waybill data fast from video tape system, May 24  
 Video Systems Corporation  
 Video terminal, Sep 62

# WABCO, Signal & Communications Division

ACI system description model VC-1, Sep - Product Showcase  
 Appoints field service representative for ACI, July 43  
 Canadian National Toronto CTC, Feb 18  
 Furnishes C60/B60 with radios for 75 locomotives, Aug 11  
 Italian affiliate plant to manufacture signaling items near Turin, Italy, June 42  
 Italian subsidiary receives \$8 million order placed by Yugoslavia, Aug 11  
 Order received from Burlington Northern for 30 radio units, Aug 11  
 PATCO runs trains automatically to serve Philadelphia, Mar 24  
 Received contract for Coney Island yard controls from NYCTA, Apr 36  
 Solid-state radio units ordered by Seaboard Coast Line, Mar 33  
 Supplies equipment for radio installation on 30 locomotives of Seaboard Coast Line, Aug 11  
 Track circuit, AFO 11, July 37  
 Two-way radio sets ordered by C60/B60, Mar 32  
 VHF base station control for D&RGW, Feb 29  
 Yard switch machine, Oct 38  
 Washington Metropolitan Transit Authority  
 Train control system out for bids, Aug 11  
 Wescom Inc.  
 Inband signaling system, Nov 33  
 Selective calling, Sep 56  
 Western-Cullen Division, Federal Sign & Signal Corp.  
 Braided patch cords, Sep - Product Showcase  
 Power supply units, Oct 34  
 Western Electric Co.  
 Contract given to General Railway Signal Co. to equip NYCTA cars with ATC, July 34  
 Millimeter waves transferred in pipe can carry 250,000 phone calls simultaneously, Apr 43  
 Western Pacific  
 Management Information and control system (MICS), Jan 16  
 Microwave in service Sacramento-Portola, Cal., Nov 27  
 Western Union Computer Utilities Inc.  
 Environment monitors, Nov 30  
 Power Guard, Sep - Product Showcase  
 Western Union Corp.  
 FCC asked to deny applications for microwave network, June 46

FCC issues directive to clear the way for Western Union to acquire Bell Systems teletype exchange service in 1971, Oct 43  
 Forms new company for data services, Aug 10  
 Sale of AT&T teletypewriter exchange service approved by FCC, Aug 11  
 Seeks full hearing on Datran microwave systems, Aug 10  
 Western Union Telegraph Co.  
 Awards contract for software services, Feb 41  
 Becomes a subsidiary of Western Union Corporation, Mar 33  
 Telpak sharing argument heard by FCC, Mar 32  
 TWX plus Telex equals more competition, June 40  
 Will buy Bell System's Teletypewriter Exchange Service, (TWX) Mar 33  
 Westinghouse Air Brake Co. (See WABCO)  
 Westinghouse Electric Co.  
 BART controls "dry run" tested, May 13  
 Hoyler, R. C. Advisory Engineer, Vehicle Systems Projects  
 Advocates advantages of improved technology, Mar 19  
 Kalra, R.P.S., Communications & Control  
 Automatic train stopping has been developed for rapid transit, May 18  
 Low light level TV has railroad use, Sep 68  
 Television camera, Dec 38  
 Thorne-Booth, G.M., Manager Communications & Control  
 Automatic train stopping has been developed for rapid transit, May 18  
 Trains can reach 300 mph from 3rd rail pickup, Jan 43  
 Will conduct test runs for BART Mar 32  
 Wheel detectors (See detectors)  
 Wheel-to-rail contact phenomenon explained, Apr 22  
 Wheel oscillation effects track shunting, Apr 30  
 White Manufacturing Co.  
 Appointed Modern Supply Co.'s sales representative for switch heaters, Jan 43  
 Switch heater, Aug 34  
 Wire (see cable)  
 Wyle Computer Products  
 Remote data terminal, Sep - Product Showcase

Xenex Corporation  
 Computerized car tracing, Sep 56

## Yards

Automatic yards have process controls, July 12  
 Canadian National connects ACI to mini-computer, Dec 14  
 Car braking system to be tested by Japan National Railway, Aug 10  
 Classification yard upgraded with new master retarder on L&N, Aug 13  
 CTA installs bus monitoring system, July 26  
 General Electric GE/PAC 4000 process control computer in automatic classification yards of Alton & Southern at East St. Louis, Ill., July 16  
 General Electric GE/PAC 4020 process control computer in automatic classification yards of Burlington Northern at Pasco, Wash., July 16  
 General Electric GE/PAC 4020 process control computer in automatic classification yards of Penn Central at Selkirk, N.Y. and Columbus, Ohio, July 16  
 Honeywell DDP-516 process control computer in automatic classification yard of Burlington Northern at N. Kansas City, Mo., July 16  
 Honeywell DDP-516 process control computer in automatic classification yards of Canadian Pacific Railway at Calgary, Alta., July 16  
 Honeywell DDP-516 process control computer in automatic classification yard of Missouri Pacific-T&P at Ft. Worth, Texas, July 16  
 Honeywell DDP-516 process control computer in automatic classification yard of Norfolk & Western at Bellevue, Ohio, July 16  
 Honeywell DDP-516 process control computer in automatic classification yard of Santa Fe at Argentine, Kan., July 16  
 Honeywell DDP-516 process control computer in automatic classification yard of Southern Pacific at Eugene, Ore., July 16  
 IBM 1800 process control computer in automatic classification yard of Southern Pacific at Houston, Texas, July 16  
 IBM 1800 process control computer in automatic classification yard of Union Pacific at N. Platte, Neb., July 16



MP upgrades communications for MIS, Feb 41  
 Modeling via computer aids yard design, July 21  
 Penn Central automates Columbus, Ohio classification yard, Sep 14  
 Penn Central ups its service at Buckeye classification yard, Columbus, Ohio, Oct 17  
 Radio controlled units help steel company, Dec 19  
 Retarder contactor panels (General Railway Signal Co.) Jan 46  
 Retarder, electro-dynamic (Siemens America Inc.) Jan 44  
 Retarder, speed control (General Railway Signal Co.) June 35  
 Yugoslavia  
 Places \$8 million order for S&C equipment with Italian subsidiary of WABCO, Aug 11

## PRODUCT NEWS

ACI system, model VC-1 (WABCO Signal & Communications Div.) Sep - Product Showcase  
 Adaptor, communications (Mohawk Data Sciences Corp.) Sep - Product Showcase  
 AMP-Pak kits (American Pamcor Inc.) Nov 30  
 Antenna guide (Antenna Specialists Company) June 34  
 Antenna, microwave (Andrew Corp.) Sep 58  
 Antenna systems (Andrew Corporation) Feb 36

Batteries, primary (Union Carbide Corp.) June 35  
 Battery chargers (Thomas A. Edison Industries, Primary Battery Div.) Jan 48  
 Battery charger (Nife Incorporated) May 31  
 Battery charger (Power Conversion Products Inc.) Sep 64  
 Battery/converter (Nife Incorporated) Sep 62  
 Battery filler, storage (Thomas A. Edison Industries, Primary Battery Div.) Sep 60  
 Battery, nickel-cadmium (Exide Power Systems, Div. ESB Inc.) Sep - Product Showcase  
 Brand-Rex catalog (Brand-Rex Div., American Enka Corp.) Nov 30

Bridge, four wire (Farinon Electric) Dec 39  
 Brush cutter (Kershaw Manufacturing Co., Inc.) May 31

Cable, bow-ty (Panduit Corp.) Sep 64  
 Cable cutter (Mathias Klein & Sons Inc.) Nov 33  
 Cable, power (The Kerite Company) Sep - Product Showcase  
 Cable systems, coaxial (Cable Communications Systems Inc.) Sep - Product Showcase  
 Camera CCTV (Motorola Communications & Electronics Inc.) Sep - Product Showcase  
 Carrier level meter (Continental Telephone Electronics Corp.) Oct 38  
 Car tracing, computerized (Xenex Corporation) Sep 56  
 Computer, business (The Singer Company, Friden Div.) Oct 34  
 Computer, engineering, 6000 series (EMR Div. Weston Instruments Inc.) Dec 39  
 Computer, process control (Automation Products Div., General Automation Inc.) Apr 31  
 Conversion units (Railroad Accessories Corp.) Nov 30  
 Converter, code (Nationwide Electronic Systems Inc.) June 34  
 Converter, FSD (Tele-Dynamics) June 34  
 Crossing gate (General Railway Signal Co.) Nov 30

Data communications set (Lankurt Electric Co., Inc.) June 35  
 Data couplers (Novation Inc.) Sep 57  
 Data modems (Sangamo Electric Company) Mar 31  
 Data input system (Honeywell Data Products Division) Oct 34  
 Data system I/O (Friden Division The Singer Co.) Sep 61  
 Data set (General Electric Co.) Apr 31  
 Data set (International Communications Corp.) Dec 38  
 Data set (Lankurt Electric Co. Inc.) Aug 34  
 Data set (Lynch Communications Systems) July 36  
 Data set (Rixon Electronics Inc.) Sep 56  
 Data set (Sangamo Electric Co.) Sep 58  
 Data set (Tele-Dynamics, Division of Ambac Industries Inc.) Sep 59  
 Data set, diginet (General Electric Telecommunication Products Department) May 31

Data systems (General Electric Communications Products Dept) July 37  
 Data system (Lankurt Electric Co. Inc.) Dec 38  
 Data terminal (Onsida Electronics Inc.) Mar 31  
 Data terminal interface test set (Dataprobe Inc.) Aug 34  
 Datatone RTCT (Datatone Division, Trepac Corp.) Dec 39  
 Detector, leak (E.F.I. Inc.) Nov 30  
 Detector, switch point (General Railway Signal Co.) Feb 36  
 Detector, wheel (Siemens America Inc.) Apr 31  
 Digger/Derricks (Pitman Manufacturing Co.) Oct 34  
 Digital decoder (Secode Electronics) Mar 31  
 Digital Instruments (Simpson Electric Co.) July 36  
 Digital plotting systems (California Computer Products Inc.) Sep - Product Showcase  
 Document reader (Motorola Instrumentation & Control Inc.) Jan 48

Encoder (Reach Electronics Inc.) Sep 59  
 Environment monitors (Western Union Computer Utilities) Nov 30

Fencing (Copperweld Steel Company) June 34  
 Filter assemblies (Lynch Communication Systems Inc.) May 31  
 Flasher, solid-state (Railroad Accessories Corp.) Jan 44

Generator, meter/signal (The Singer Company) Sep 63  
 Glossary of commonly used computer terms (General Automation Inc.) Sep 56  
 Guide-G10-04 (General Cable Corporation) June 35

Heater, switch (The Rails Co.) Sep 62  
 Heater, switch (White Manufacturing Co.) Aug 34

Inband signaling (Lynch Communication Systems) Mar 30  
 Inband signaling system (Wescam Inc.) Nov 33

Jig Board, wiring harness (Pan-dult Corp.) July 37  
Joint checker, insulated (Harmon Electronics Inc.) July 36, Sep 64

Keyboard input system (Computer Machinery Corp.) Sep - Product Showcase

Keypad, pushbutton (Automatic Electric Co.) Jan 44

Line printer (The National Cash Register Co) Sep 56  
Line repeater units (Lynch Communications Systems) Oct 38

Microfilm system (Itek Business Products) Dec 39  
Microwave system (General Electric Communication Products Dept.) Feb 36  
Microwave systems (Lenkurt Electric Co., Inc.) Sep - Product Showcase  
Microwave system (Motorola Communications & Electronics Inc.) June 35  
Mini-computer (Hewlett-Packard Company) Sep 56  
Modem, acoustic (Data Products Stelma Telecommunications) Sep 58  
Modem, narrow band (ESE Limited) Sep 56  
Modules, display (Conrac Corp.) Dec 39  
Monitoring device (Pulse Communications Inc.) Sep 67  
Multimeter (Simpson Electric Co.) Nov 33  
Multiplex (United Business Communications Inc.) Sep 60  
Multiplex system, microwave (Canadian Marconi) Sep 60

Optical Reader (Varian Data Machines) Dec 39

Panels, interlocking & CTC (Railroad Accessories Corp.) June 35  
Patch cords, braided (Western-Cullen Div., Federal Sign & Signal Corp.) Sep - Product Showcase  
Path loss testing service (Microwave Systems Co.) Sep 57

Power Guard (Western Union Computer Utilities Inc.) Sep - Product Showcase  
Power supply, modular (Tele-Dynamics) Apr 31  
Power supply units (Western Cullen Division, Federal Sign & Signal Corp.) Oct 34  
Power system, automatic (Continuous Computer Power Inc.) Sep - Product Showcase  
Power system, micro (United States Motors Corporation) Feb 36

Radio base station (General Electric) Mar 31  
Radio extension set (Secode Electronics) Jan 46  
Radio, microwave relay system (Collins Radio Co.) Sep 58  
Radio, two-way (General Railway Signal Company) June 34, 35  
Radio, two-way (The Hallicrafters Co.) July 36, Sep - Product Showcase  
Radio, two-way (Motorola Inc.) Mar 30  
Receiver modules, touch-tone (Bramco Controls Div. Ledex Inc.) Sep 65  
Relay, crossing (Railroad Accessories Corp.) Mar 30  
Relay, solid-state (Multiplex Communications Inc.) Mar 31  
Relay, telegraph (Trepac Corporation of America) June 34  
Retarder contactor panels (General Railway Signal Co.) Jan 46  
Retarder, electro-dynamic (Siemens America Inc.) Jan 44  
Retarder, motor-control panel (General Railway Signal Company) Aug 34  
Retarder, speed control (General Railway Signal Company) June 35  
ROCR System/70, OCR unit (Cognitronics Corp.) Sep - Product Showcase  
RS&C self-teaching lessons (Cleveland Institute of Electronics) Sep - Product Showcase

Selective calling, tone-pulse (Plat-General) Sep - Product Showcase  
Selective signaling (Wescom Inc.) Sep 56  
Selector (Secode Electronics) June 35  
Shelter, equipment (Grasis Fabricating Co.) Jan 46  
Shunting system (W. T. Cox Company) Jan 47  
Snow melter (Railroad Accessories Corp.) Sep - Product Showcase  
Splice kits (Hysol Division, The Dexter Corp.) Dec 38

Surge protectors (Siemens America Incorporated) Mar 31  
Switch machine, electric (General Railway Signal Company) Mar 30  
Switch machine, yard (Signal & Communications Div. WABCO) Oct 38  
Switching processor (Stromberg-Carlson Corp.) Feb 36

Tape, insulating, sealing (American Pamcor Inc.) Jan 44  
Tape, pressure-sensitive (American Pamcor Inc.) July 37  
Telemat automatic dialer (Kameco Electronics Ltd.) Sep - Product Showcase  
Television camera (Westinghouse Electric Corp.) Dec 38  
Terminal, TC 500 (Burroughs Corp.) Sep - Product Showcase  
Terminal, 820/03 (Victor Comptometer Corp.) Sep - Product Showcase  
Terminal, computer-communications (Data Products Corporation) Sep - Product Showcase  
Terminal, CRT (Transistor Electronics Corp.) Jan 46  
Terminal, data (Lynch Communication Systems) June 34  
Terminal, data ASR (Peripheral Data Machines Inc.) Sep - Product Showcase  
Terminal, graphics (Monitor Displays) Dec 38  
Terminals, magnetic tape (Teletype Corp.) Aug 34, Sep-Product Showcase  
Terminal, remote data (Wyle Computer Products) Sep - Product Showcase  
Terminal, telegraph (Tele-Dynamics) May 31  
Terminal, video (Video Systems Corporation) Sep 62  
Terminal, video communication (American Data Systems) Sep - Product Showcase  
Test set (James G. Biddle Co.) Sep 65  
Third rail guard cover (Stokes Molded Products) Jan 47  
Track appliance catalog (Hayes Track Appliance Co.) June 35  
Track circuit (AFO II) (WABCO, Signal & Communications Div.) July 37  
Track circuit, FSO (General Railway Signal Co.) Oct 34  
Typewriter, T30 recording/transmitting (Data Instruments Company) Sep - Product Showcase  
Voltage transient monitor (Data Research Corp.) Sep 67  
Volt-ohm-milliammeter (Triplett Corp.) Sep 66



Wheel thermo-scanner unit (General  
Railway Signal Co.) Sep -  
Product Showcase  
Wire cutter (American Pmc Inc.)  
Sep 62

## PERSONAL MENTION (See People)

## PEOPLE

Abbott, Elsworth L., July 40  
Aboudara, Deane N., Aug 40  
Adams, Gene K., July 41  
Adams, Ray H., Jan 40  
Agee, Jerry L., Apr 32  
Aikman, Frank Jr., June 37\*  
Aldern, Joseph D., Aug 40  
Alford, B. J., Feb 44  
Anderhous, Bernard, Oct 34  
Anderson, Allen, May 39  
Anderson, Gene, May 39  
Anderson, W. E., Jan 40  
Anke, Richard K., May 38  
Atchison, J. D., Oct 34  
Atkinson, G. P. June 37  
Aul, Gerald J., Aug 38\*  
Aven, Thomas J., Feb 44

Bailey, V. R., Aug 38  
Baker, G. M., Jr., Feb 44  
Baker, R. G., May 38  
Baldwin, George L., Oct 34  
Ballard, J. P., Jr., May 38  
Ballou, E. W., May 38  
Banks, Allen H., Jr., Feb 43  
Barley, Robert L., Apr 32, Oct 34  
Barske, E. G., Jan 40  
Bartley, Wayne K., Aug 38  
Bass, J. T., July 40  
Batcheller, Kenneth W., Feb 43  
Bates, R. T., July 40  
Beach, Clifford P., Jr., July 40  
Beard, W. W., Aug 40  
Beck, Elvin R., Dec 44 \*  
Belury, N. George, Mar 34

Bender, Donald G., May 40  
Berns, Melford, Feb 44  
Bethscheider, Guenther P., Dec 44  
Beymer, J. Glenn, June 37  
Billingslea, C. C., Feb 44  
Birt, R. Dan, Aug 40  
Bischof, Jerry A., Oct 34  
Bjorklund, W. R., July 40  
Black, J. Neville, Feb 43  
Blackburn, Rusling D., Jan 40  
Blevins, Ritchie A., Jan 40  
Bobich, James P., May 38  
Bolger, L. C., July 40  
Bolt, J. W., May 38  
Booth, G. H., Aug 38  
Bostic, S. H., May 38  
Bouchet, Ernest (obit) Apr 32  
Bowden, H. A., May 38, Aug 38  
Bowerman, Gary J., Jan 40  
Bowman, Charles D., Apr 32  
Boyd, Curtis A., Jan 40  
Brandt, R. H., Oct 34  
Branham, Frank T., Jan 40, May 38  
Breitung, A. G., May 38  
Brill, Mark J., Aug 40  
Brodey, C. Scott, Dec 44  
Brosnan, W. T., Aug 38  
Broussard, P. L., Jan 40  
Brown, J. D., Aug 38  
Brown, J. K. Aug 38  
Brown, Ronald A., Jan 40  
Bryan, W. T., Aug 38  
Buran, Robert, Dec 45\*  
Burge, R. A., Oct 34  
Burger, Thomas W., May 38  
Burke, Thomas L., Jan 40  
Burnside, W. J., May 38  
Bush, W. K., Apr 32

Call, G. L., Aug 38  
Callender, E. R., July 41  
Campbell, G. R., Oct 34  
Campbell, John J. Jr., Apr 32  
Carey, A. J., May 40  
Carey, Oliver G., Oct 34  
Carlson, Glenn E., June 37  
Carlson, Wendell J., Oct 34  
Carraro, F. X. Jr., June 37  
Carroll, J. E., Aug 38  
Casselberry, Robert L., May 39  
Chandler, R. P., July 40, Oct 34  
Chandler, W. P., May 38  
Chaney, W. D., Aug 38  
Chiesl, O. M., May 40\*  
Clawson, Robert G., Apr 32  
Claypool, John G., Jr., Dec 44  
Clemons, E. E., Jan 40  
Clisbee, D. E., Aug 38  
Cochran, Thomas D., Aug 40  
Compher, Clarence W., May 39\*  
Conte, P. P., May 40\*  
Cook, Roy, Dec 44  
Coxley, Richard Q., Aug 40  
Cosh, Francis R., Dec 45  
Coyme, F. H., Apr 32  
Crawford, J. A., Oct 34  
Crenshaw, John R., Feb 43  
Crisp, W. W. Aug 38  
Cullum, Glenn J., July 41\*  
Cummings, Hubert F., Jan 40

Cundiff, E. N., Aug 38  
Curry, Harold J., Dec 44  
Cusick, Leo J., July 40  
Cyrus, Benjamin B., Jan 40

Daniel, B. L., June 37  
Darling, J. A., Jan 40  
Davidson, K. H., May 38  
Davis, Paul W. Apr 32  
Deane, C. E., May 38  
Delaware, M. L., Jan 40  
DeMoss, Hugh L., Jan 40  
Derque, J. A., May 38  
Devaney, John L., Mar 34  
DeWayne, Babb, May 40  
Diamond, R. D., Aug 38  
Dobbins, John H., July 40  
Dodds, T. E., Oct 34  
Dolin, Gerald P., Jan 40  
Doughty, C. W., Aug 38  
Downs, Jack S., July 40\*  
Drennon, Joseph E., July 40  
Drummond, P. T., July 40  
Duchanes, James K., May 40  
Duffy, Eugene T., Feb 44  
Dugle, D. P., May 38  
Dumas, Edwin A., May 38  
Duncan, A. T., Aug 38  
Duncan, Harold V., July 40  
Duncan, J. C., July 40  
Dunn, F. L., May 38  
Durand, Gerald C., Feb 43  
Duvall, T. G., Jan 40  
Dye, S. L., Aug 38

Edson, Arthur O., Aug 38, Oct 34  
Edwards, Billy Charles, July 40  
Edwards, William A., Feb 44\*,  
Dec 45  
Elland, Arthur C., Jr., July 40  
Elkins, James D., Jan 40  
Ellis, W. B., Jan 40  
Elmen, J. Fred, Dec 45  
Elpel, J. L., May 38  
Erickson, Frederick G., June 37  
Erickson, Willis E., May 40  
Easmap, A. L., July 40, Oct 34\*  
Evanoff, W. H., Feb 43  
Evans, R. E., Aug 38  
Evans, Thomas H., May 39\*  
Eveland, E. T., Oct 34  
Eyler, Leonard R., Aug 40

Faris, M. E., May 38  
Farrell, A. W., Feb 44  
Finch, J. M., Jan 40  
Finnell, Paul D., Jan 40  
Fish, Robert C., Mar 34\*  
Fisher, W. R., July 41\*  
Flanagan, Paul, Aug 38  
Forsha, Jack R., Aug 40  
Foster, J. J., Jan 40  
Franklin, L. J., Aug 38  
Freeman, G. W., Aug 38  
Fuller, John H., Feb 44

Gaps, J. J., Jr., May 38  
 Gardiner, John C., June 37  
 Garrett, E. O., July 41  
 Garrison, V. L., Mar 34  
 Gates, David A., Oct 34  
 Gehrke, E. G., July 40  
 Gerber, Jack B., Mar 36  
 German, James M., Oct 34  
 Gernand, Frank, May 39  
 Geronimo, J. N., May 38  
 Clifford, Richard P., June 37  
 Gilbert C. W., May 40  
 Givler, Michael C., May 38  
 Goins, Aaron H., Apr 32  
 Grant, Clifton P., Dec 44  
 Grantham, Raymond B. (obit) Dec 45  
 Greenberg, William L., Apr 32  
 Greve, W. W. Aug 38  
 Grimes, E. A., Aug 38  
 Groff, Glen F., July 40, Oct 34\*  
 Groome, Preston E., May 39  
 Gruber, Louis, Jan 43  
 Guba, Richard A., Dec 45

Hahne, Walter O. (obit) Jan 40  
 Hammond, John L., May 38  
 Hanna, C. J., Oct 34  
 Harmon, Robert C., Feb 44  
 Harmon, Robert E., Feb 44\*  
 Harris, Dr. William J., Jr., Feb 43  
 Hart, Edward J., Feb 44  
 Hart, W. M., Jr., July 40  
 Harvey, Jerome A., Oct 34  
 Harwell, J. A., Aug 38  
 Hathaway, H. L., May 40\*  
 Haupt, Wayne, Jan 40  
 Hayes, Gordon Jr., Dec 45  
 Hedding, L. K., May 40\*, July 41  
 Heidenreich, John T., Apr 32  
 Helgeson, Andrew L., May 38  
 Henricks, Carl L., Feb 44\*  
 Henry, K. L., Aug 38  
 Hensel, John (obit) Dec 45  
 Herb, John A., July 41  
 Herr, J. M., Aug 38  
 Hesterley, John M., Feb 43  
 Higgins, J. O. Oct 34  
 Hill, D. C., May 38, July 40\*  
 Hinton, Herbert L., July 40  
 Hiranandani, Hiro R., Dec 44  
 Hoegland, J. L., Aug 38  
 Hobbs, Robert E., May 38  
 Hoiby, James C., May 39  
 Hoist, Francis S., Jan 40  
 Hoogerhyde, Arthur, Feb 44\*  
 Horne, Carl L., Jan 40  
 Horton, Carl L., Feb 43  
 Houstan, Francis J., June 37  
 Howard, Clarence F., Jr., Jan 40  
 Hubbard, Allen III, July 41\*  
 Huffman, D. D., May 40\*  
 Hughes, Daniel R., Jr., Feb 43  
 Hungerford, C. Jr., July 40  
 Hunt, James N., Feb 44  
 Hurd, W. A., Aug 38  
 Hursh, Charles M., July 41

Hurt, Joseph B., May 38  
 Hutchinson, E. F., May 38\*  
 Hutt, G. J., Aug 38  
 Huttel, Robert A., June 37  
 Hvizd, Andrew, Jr., Feb 44

Inglis, Andrew F., Mar 36  
 Ishu, S., Oct 34

James, F. B., May 38  
 Janusz, J. J., Mar 34  
 Jarzombek, A. M., July 34  
 Jenco, John F., May 38  
 Johnson, Charles P., Jan 42  
 Johnson, Duane, June 37  
 Johnson, L. E., Jan 40  
 Johnson, Robert T., Jan 40  
 Johnson, T. A., Oct 34  
 Jones, Donald T., Apr 32\*  
 Judge, Thomas J., May 39\*

Karow, Robert M., Mar 36\*  
 Keenan, Vincent J., Mar 34  
 Keller, J. Samuel, Oct 34  
 Kelley, Edward R., Jan 40  
 Kelley, W. D., May 38  
 Kellow, Gaylord A., Feb 43  
 Kelly, Joseph C., July 40  
 Kelly, William T., Jr., Mar 34  
 Kemp, J. M., June 37  
 Kennedy, W. T., Jr., Jan 43  
 Kenny, Matthew A., Mar 36  
 Kessler, Irving K., Mar 36  
 Kilrea, W. C., Feb 44  
 King, Eltron R., Jr., Feb 43  
 King, Jon A., Jan 40  
 Kirkpatrick, C. E., Aug 38  
 Klivans, Norman R., Jan 42  
 Knorr, Fred W., Apr 32\*  
 Koester, George H., May 38\*  
 Kovalcik, Vincent P., Aug 38  
 Kraich, C. W., Aug 38  
 Kress, D. M., July 40  
 Kribs, William R., May 38  
 Krisco, Carl, Mar 36  
 Krueger, E. C., Jan 40

LaCoss, Milton E., Jan 40  
 Lamonthe, Andrew H., Jr., July 40  
 Lamphier, T. J., Apr 32  
 Landreth, John N., Jan 40  
 Larson, John I., Apr 32\*  
 Latone, S. M., May 39\*  
 Lavarack, Fred, Sep 54  
 Lawson, Kenneth L., Feb 43  
 Leach, A. B., Apr 32  
 LeClair, T. J., Aug 38  
 LeDoux, Paul R., Oct 34  
 Lee, W. Alton, May 38, Oct 34  
 Lehrke, R., July 40\*  
 Lehrman, Donald R., Jan 42  
 Len, Joseph A., Feb 44  
 Lisa P., May 38

Litford, M. L., Aug 40  
 Lockwood, Robert A., July 41\*  
 Longnecker, Walter L., Jan 42  
 Loynd, Richard B., Jan 42  
 Lynch, Thomas E., Jan 42

Machesney, James A., July 34  
 Melick, Paul D., Dec 44  
 Mann, Earle A., Jan 43  
 Mann, Robert E., Jan 43  
 Mansfield, W. Lloyd, Oct 34  
 Marbury, John B., Jr., May 38  
 Marsh, John L., Jr., Jan 40  
 Martin, W. W., Jr., Feb 43  
 Massey, Howard D., Aug 38  
 Matthews, B. L., Apr 32  
 Maxey, J. D., Jr., July 40  
 McGhee, W. B., Aug 38  
 McGrath, H. J., Aug 38  
 McGrath, Herman G., Aug 40\*  
 McKechnie, Arthur K., Jan 40  
 McLain, William J., July 41\*  
 McMahon, D. J., Jan 40  
 McMillan, H. E., Jan 40  
 McMullen, Alan J., Feb 44  
 McNeill, Bruce L., July 40  
 McNeill, Richard G., Feb 43  
 Means, Joseph B., Feb 43  
 Meisch, Dale A., Jan 40  
 Mennel, C. Arden, Apr 32  
 Menth, Joseph D., May 39  
 Merta, B. R., Apr 32\*  
 Merta, Charles H., May 40  
 Michael, Lewis B., Jr., Jan 40,  
 June 37  
 Miller, H. L., Jan 40  
 Miller, William A., May 38  
 Mincks, J. A., Apr 32  
 Mitchell, Gary J., Mar 34  
 Molinari, Ralph, Aug 40  
 Montague, P. E., June 37  
 Moore, Foster R., Jan 40  
 Moore, Oren G., Jr., Aug 40  
 More, Nary D., Jan 40  
 Morrissey, John J., Aug 38\*  
 Mossa, F. May 39  
 Muller, Leonard A., Dec 44\*  
 Murphy, F. J., Apr 32  
 Murphy, J. Kay, Oct 34  
 Musgrove, Edward H., Aug 38  
 Myers, W. O., May 40

Nealis, O., Jr., Aug 38, Oct 34  
 Nelson, Harold R., Jan 40  
 Nelson, Richard, May 40  
 Nethken, J. D., Jr., July 40  
 Newson, J. Herman, Feb 43  
 Nicely, Clarence J., Jan 40  
 Niziolek, Melvin, Dec 45  
 Noorda, Raymond J., Dec 44  
 Norris, Johnnie F., July 40

Oliphant, L. W., Oct 34  
 Olson, W. J., Aug 38



Osman, Russel, Apr 32

Page, Richard A., Aug 38  
 Palya, Michael, Jr., Oct 34  
 Paoni, Anthony J., Dec 45  
 Park, C. Adair III, Feb 43  
 Parrish, B. G., June 37  
 Paulsen, M. F., Aug 38  
 Pears, Gerald E., May 38  
 Pearson, Thomas M., Jr., Oct 34  
 Peebles, Claude A., Jan 40, Apr 32  
 Peeler, John E., May 38  
 Peterson, D. E., May 38, Oct 34\*  
 Peterson, J. W., Aug 38  
 Petrie, Joseph N., Aug 38  
 Pfeiffer, P. J., Aug 38  
 Phillips, A. Leslie, Feb 44  
 Pickett, L. Stanley, May 38  
 Pierce, Gregory W., May 38  
 Pinet, William T., Mar 36  
 Pinson, J. E., Mar 34  
 Pitbladdo, William A., Jan 43  
 Pollock, Robert T., Jan 40  
 Porter, John W., Dec 45\*  
 Post, Welles M. (obit) Apr 32  
 Pudlak, Andres, Apr 32\*  
 Putsche, O. C., Feb 43

Raasch, R. C., Apr 32  
 Radcliffe, William J., July 34  
 Rademacher, R. L., May 38  
 Ramsdell, William F., II, Jan 40  
 Rand, M. M., Feb 44  
 Rank, Henry L., Oct 34  
 Rankin, C. C., Oct 34  
 Ransom, David L., July 34  
 Ray, D. J., May 38  
 Reagan, J. A., Aug 38  
 Reed, Lyle D., Apr 32  
 Reigel, R. B., May 38  
 Reinitz, William O., Aug 40  
 Rentz, Donald V., Mar 36  
 Risely, Richard E., July 41  
 Roberts, M. R., May 38  
 Robie, G. E., Aug 38  
 Rodden, Robert V., Apr 32\*  
 Rolf, Joe A., July 34  
 Rondeau, Arthur N., Jan 40  
 Rothermel, R. S., May 39  
 Ruegg, Donald G., Jan 40  
 Russell, Clarence N., July 40  
 Russell, Robert G., Feb 44\*  
 Russell, Thomas W., Jr., Mar 34  
 Ryan, M. S., May 38

Salmons, W. B., May 38  
 Saltzberg, Theodore, Aug 38  
 Samrok, F. E., Aug 40\*  
 Sattler, John A., July 40  
 Scarlett, James Y., June 37  
 Schafer, David E., Apr 32  
 Schindler, George C. (obit) Jan 40  
 Schomburg, Wilfred K., Apr 32

Schweizer, Roman G., June 37  
 Scott, Harry, Sep 54  
 Seaborn, Sylvester, Jr., May 38  
 Senffner, Roy A., Oct 34  
 Senn, F. N., Jan 40  
 Sharp, H., May 38  
 Sharp, Robert A., June 37, Aug 38  
 Shaw, Willard K., Mar 34  
 Shelton, R. O., Apr 32  
 Sheridan, William L., Apr 32  
 Shiels, Donald G., Jan 40  
 Shurson, Robert C., Jr., May 38  
 Sickles, Carlton R., Feb 44  
 Simpson, Walter W., Jr., June 37  
 Sims, M. H., May 38  
 Sines, Guerdon S., Mar 34  
 Siris, Robert E., Mar 34  
 Skinner, J. E., Jan 40  
 Sloan, R. B., Apr 32  
 Sluis, Mark H., Mar 34\*  
 Small, Bobby G., Jan 40  
 Smullenburg, Fred W., May 39\*  
 Smith, Arthur H., June 37  
 Smith, C. D., Aug 38  
 Smith, E. M., June 37  
 Smith, J. H., Aug 38  
 Smith, Kermit R., Apr 32  
 Smith, Norman W., Mar 34  
 Spence, Michael A., Feb 43  
 Spotten, D. L., May 38  
 Stanley, Richard G., May 38  
 Staples, Crawford E., June 37\*  
 Steininger, Charles W., Oct 34  
 Steis, G. W., July 40  
 Stephenson, Eric P., June 37  
 Stepp, Richard F., July 40  
 Stevenson, A. L. (obit) July 41  
 Steward, H. R., Jr., Mar 36  
 Stinson, Glenn E., Feb 44\*  
 Stipancic, Charles E., Mar 36\*  
 Storck, C. R., Apr 32  
 Story, Frank W., Apr 32\*  
 Stucker, James T., July 40  
 Summers, Oscar H., July 40

Taylor, Arthur M., Mar 34  
 Taylor, W. B., June 37  
 Telfeld, Albert R., June 37  
 Terlap, Richard G., May 38  
 Tervay, Julius C., Dec 45  
 Thomas, Jason, Aug 38  
 Thomas, Jewell R., Oct 34  
 Thomsen, D. H., May 38, Oct 34\*  
 Tiedemann, F. J., May 39  
 Tonay, Andrew J., Jr., Jan 40  
 Trantham, W. Earl, Jr., July 41\*  
 Tritt, Richard F., Feb 43  
 Tronsent, A. P., Jan 40  
 Tucker, P. L., Jan 40

Ulrich, Theodore, Aug 38\*  
 Underhill, Mel L., May 38  
 Urschel, Alan K., Aug 38\*, Dec 44

Vellines, Robert P., Jr., Jan 40,  
 Oct 34  
 Vigraron, Eugene J., Feb 44

Walker, M. B., May 38\*  
 Waller, Carey H., Oct 34  
 Wallis, Joseph Herbert, Aug 38\*  
 Walther, T. H., Dec 44  
 Walton, Joseph L. III, July 40  
 Walts, William K., Oct 34  
 Warren, Archie, E., May 39  
 Watson, Charles E., Jan 40  
 Webster, R. D., Aug 38  
 Welch, C. Hoye, Jr., July 40  
 Wesman, C. H., May 38\*  
 Wessels, Donald W., Dec 45  
 Westland, Warner M., Oct 34  
 Wethern, R. F., May 38  
 Wheeler, D. R., Aug 38  
 Wheeler, William S., Feb 44  
 White, Arthur L., Jr., Oct 34  
 White, K. L., May 38  
 White, Neal C., July 40\*  
 Whitehead, Asa C., Jr., Feb 43  
 Wicks, Gerald F., Aug 40  
 Wiegemann, F. L., Apr 32, June 37  
 Wigginton, Russell T., Feb 43  
 Wigton, T. W., July 40\*  
 Williams, Howard M., Jr., Mar 34  
 Williams, James, Jan 40  
 Williams, Robert J., May 38  
 Wilson, W. Eugene, Feb 43  
 Wilt, R. E., Jan 40  
 Wimprine, J. T., May 38  
 Winkle, Meek M., July 40  
 Winter, James R., Jan 40  
 Withrow, R. N., June 37  
 Wollan, Earl, May 39  
 Wood, W. L., May 38  
 Wood, Willard A. (obit) May 40  
 Woods, Gordon F., July 40  
 Workman, G., July 40  
 Wright, R. W., Jr., May 38  
 Wroblicky, Theodore P., May 38

Yeldell, Joseph P., Feb 44  
 Young, Kenneth S., July 40\*  
 Yount, Norman F., Apr 32\*  
 Youngblood, J. W. June 37

Zabrockas, Frank W., Oct 34  
 Zornes, James E., Jan 40

Asterisk (\*) Published Photograph



